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please pass the nitrogen!

It takes a lot of sugar cane to satisfy America's sweet tooth. And for making such varied items as drugs, plastics, solvents, cattle feeds, wax, anti-freeze, and paper, to name a few. This year more sugar cane is needed than ever before. How are we going to get it? With nitrogen. No single factor is as important for boosting cane yields and increasing per-acre harvests.

Of all the sources of nitrogen, anhydrous ammonia is the most concentrated and the most economical. It is this preferred form that CSC produces at its Sterlington plant in Louisiana. Most of CSC's production is used to increase the crop yields of Gulf Coast farming land.

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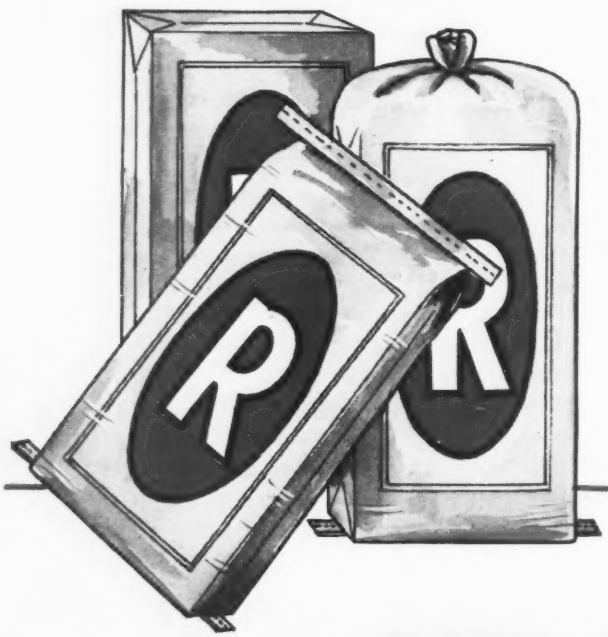
CSC

Safety First . . . always the best policy on the 4th, and on every day in the year!



Safety first is a strong talking point for Raymond Multi-Wall Paper Shipping Sacks. They give your fertilizer safety first protection all the way from packer to user. Multi-walls of heavy, specially prepared Kraft paper supply the extra strength in Raymond Shipping Sacks.

Raymond Multi-Wall Paper Shipping Sacks are CUSTOM BUILT in various types, sizes, and strengths to meet the needs of the producer, packer, and shipper of fertilizer. They are available printed in various colors, or plain.

THE RAYMOND BAG COMPANY
Middletown, Ohio

RAYMOND
MULTI-WALL PAPER SHIPPING SACKS

In this issue . . .

Packaging is an important phase of all farm chemicals production. In these times of shortages and allocations, it is especially important for manufacturers to give attention to their packaging problems and the multiple means by which they can be solved. Beginning on page 11 of this issue is a special report on packaging,

Fertilizer technology is the special realm of the Fertilizer Division of the American Chemical Society, and each year the Division meets to hear many of the fertilizer industry's most vexing problems discussed by men who know them best. This year is no exception, and on page 22 you will find a brief resume of the papers to be presented at the Division's meeting to be held in New York City.

Debating the question, "Do We Need Pest-Control Chemicals?" was probably the furthest thing from Dr. Fred C. Bishopp's mind when he appeared before the Delaney Committee this June to testify in the hearings on the use of chemicals in and on food products. Still, while Bishopp's testimony, which starts on page 26, makes no effort to directly answer the arguments presented before the Committee by some other witnesses, in the facts-and-figures style of the trained scientist, it deflates many of the specious theories advanced by those witnesses.

Service to farm chemicals manufacturers being our most urgent aim in life, this month we introduce still another new feature in your favorite farm chemicals journal. To make it easier for you to get the information you need in the operation of your business we have installed a Reader Service Card. Reader service cards have, of course, been used by the readers of trade journals for many years, but the service is new to the farm chemicals field and we hope you will make the most of it. When you need more information about a product, or a process, use the card . . . we're sure it will save you time and money.

Times change, industries progress, and with them the journals that attempt to reflect them. So it is with the venerable AMERICAN FERTILIZER magazine, a title familiar to men in the fertilizer industry for nearly 60 years. Today, the fertilizer industry isn't just the fertilizer industry. Many products in addition to plant foods are produced by mixers and formulators who once specialized exclusively in fertilizers. Plants that once operated on a seasonal, part-time basis now keep going the year around, partly as a result of entering the pesticide business. New products, new methods, and new and improved machines for processing farm chemicals appear almost daily. Supplying the nation's farmers with the materials for improved food production has made the job of the farm chemicals producer one of prime importance. Reporting that job, and helping the manufacturer to do it better, easier, and at greater profit is our intended purpose. To pin point what this journal is all about, its former title was dropped in favor of a more inclusive term. Hence, next month, AMERICAN FERTILIZER AND ALLIED CHEMICALS will come to your desk under a new title . . . FARM CHEMICALS. Be looking for you.

American Fertilizer & Allied Chemicals

the magazine of farm chemicals

Established 1894

PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 114 **JULY, 1951** **No. 7**

Contents

Cover Story

Completely automatic packaging of farm chemicals such as superphosphate, aero-cyanamid, ammonium nitrate, triple superphosphate, and pelletized mixed goods has been successfully carried out on the machine pictured on this month's cover. Supplied by the International Paper Company, it is designated the Model A Bagpaker.

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317 NORTH BROAD STREET, PHILADELPHIA 7, PA.
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A magazine international in scope and circulation and devoted to the farm chemicals industry and its allied trades.

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Pitfalls of Brimstone

Allocation of sulfur began on July 1. Under the provisions of the National Production Authority's order M-69, farm chemicals producers will have to fit their schedules to the new procedure. The order prohibits the supplier from delivering sulfur without specific NPA authority, restricts the amount that may be used, and requires each user to submit a monthly report on sulfur inventories.

The amount each user can have each month, after taking into considerations the seasonal demands of some producers is limited to 100 per cent of his average monthly use during the base period, January 1, 1950 through December 31, 1950. If M-69 means what it says, the farm chemicals industry should be at least as well off as it was last year.

Bureau of Mines figures for 1949—a period of high peacetime production—show that the petroleum industry required about 12 per cent of the sulfuric acid consumed, iron and steel 5 per cent, and industrial explosives a little more than 2 per cent. The second largest user was the chemicals industry (including military uses) which took 20 per cent of the total consumption compared to the fertilizer industry which required 35 per cent of the total sulfuric acid consumed during the period.

On the face of it, then, M-69 should provide the farm chemicals industry with the sulfur and sulfuric acid in the amounts needed to at least equal the tonnages it consumed last year. There is one clause in the order, dealing with adjustments or exceptions to M-69, that states in part, ". . . consideration will be given to the requirements of public health and safety . . ." As no single factor is as important to public health and safety as an adequate food supply, it would seem to be a foregone conclusion that plant foods and pest control chemicals would rate in the first order of importance.

But NPA—by the very same provision that mentions "public health and safety"—has the authority to deviate from its own basic rule, that of allocating sulfur on the basis of past utilization. It is perfectly true that almost every industry can build a strong case as to its essentiality, particularly the iron and steel industries, petroleum refining, and the munitions industry. But the sulfur utilization record of these industries, cited above, shows that their requirements are not as high as those of agriculture. As the wording of M-69 allows NPA officials to determine each case separately without being bound by any really effective ground rules, the fate of the farm chemicals producer in getting sulfur and sulfuric acid under M-69 is left in doubt. It depends, principally, upon the attitudes of the officials making the decisions, and this, of course, is a matter of speculation. The attitudes of the officials concerned are difficult to ascertain, but the "Defense Production Record," official voice of the Defense Production Administration of which NPA is a part, gave a hint recently as to the official line on sulfur.

The "Record" said, "Among vital industries to which sulfur is a 'must' are the following:" It then named, in the following order, petroleum, chemicals (nitroglycerine, phenol, rayon, detergents, dyes, and some other were named), rubber, paper, and last, in these words, "Agriculture depends upon sulfur and sulfuric acid for dusting, pesticides, and fertilizers." Of course, the "Record" didn't say that the "vital industries" were named in the order of their importance, but with fertilizers (on record as the largest single user of sulfuric acid) tacked on almost as an afterthought, the article betrays a nonchalance toward plant foods that is difficult to understand. Let us hope that the "Defense Production Record" does not, indeed, reflect official attitudes.

Even with the most incisive appreciation on the part of NPA as to the industry's essential nature, not all of the farm chemicals industry's sulfur-supply problems would be solved. Some years ago British and French firms, principal foreign users of U. S. brimstone, turned away from burning pyrites because our raw sulfur was cheaper and easier to use in the production of acid. Now, say European claimants lead by Britain, our efficiency is to blame for their present dependence upon us for sulfur. Building of new plants and conversion of old ones is being pushed, they say, but they add that if the U. S. wants the Atlantic Pact nations to re-arm rapidly, our sulfur must be forthcoming.

Their arguments have not gone unheeded. At the time when domestic consumers are being restricted by some sulfur producers to 85 per cent of their 1950 supplies, sulfur exports were recently increased to 250,000 long tons for the second quarter of this year. This brings the annual rate of export to 1,000,000 long tons, almost 20 per cent of our present output. The Freeport Sulphur Company reports that if third-quarter allocations are increased, domestic sales will have to be cut. While the search for new deposits goes on, while recovery processes of sulfur fumes and re-use of spent acid are being pushed, the shortage is expected to remain acute for at least two years.

For sulfur users—particularly the farm chemicals industry—who will have to trek to Washington waiting-benches to fight their psychological warfare with NPA, there is one bright note: Russia is having sulfur troubles too. Her eagerness to purchase foreign sulfur and other available indicators show that Russian industrial production is being hampered because, behind the Iron Curtain as well as in front of it, there isn't enough sulfur to go around. If the pitfalls of M-69 can be avoided until the gaps in our sulfur stockpile can be filled, there may be enough food for everyone to eat and enough peace and quiet so they can enjoy it.

—A. M. Brodine

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AMERICAN FERTILIZER & ALLIED CHEMICALS'

Trends & Forecasts

An Exclusive and Timely Report from Washington by Fred Bailey & Don Lerch

Guns in Europe at the expense of food in the United States is the verdict of top mobilization officials in closed door sessions. While not saying so directly, their actions to maintain high sulfur exports indicate that for the present Europe's industrial production is of prime importance in the race to build the strength of the free world.

Strong underlying factor is the psychological effect of increasing armament production in Europe upon the will of its peoples to fight Russia. Washington hopes that the roar of gun foundries will quicken the spirit of North Atlantic Pact nations to man the battle lines wherever they form. There is also the feeling that the support this nation receives in any future Koreas depends to a large extent upon the defensive position of Europe itself.

Officials are jittery over the potential impact of curtailed European production while U. S. factory and farm output are relatively uninhibited. So, more sulfur is on the way.

U. S. sulfur exports of 250,000 tons for the third quarter are expected to pinch supplies for fertilizer more than many agricultural leaders had figured. Some agricultural specialists estimated earlier this year that annual exports of 800,000 tons would not be unduly severe. Present indications are that exports will exceed this substantially.

Token assistance will be forthcoming from Italy and Norway, scheduled by the International Materials Conference to export 18 and 17 thousand tons of sulfur, respectively, during the third quarter. The United Kingdom will receive the biggest chunk, 105,000 tons; France, 27,000 tons; Australia, 21,000; with the remainder divided among other free nations.

Agriculture's nitrogen requirements show some signs of being given official recognition after lengthy behind-scenes battles among the USDA, NPA, and the Army. While the rate of expansion is still below USDA's hopes, it appears the months of heated debate are about to result in some action.

Morgantown is scheduled to be reactivated in spite of Army rejection of initial bids. Furthermore, the Army is ready to spend up to 8 million dollars to modernize Morgantown and provide other aids to facilitate production.

Long-delayed industry expansion is in the offing for plants with a total capacity up to 500-thousand tons of nitrogen annually. Not all the hurdles are cleared by any means. Applications by established nitrogen producers have been tangled in NPA's "pending files" for months. Nitrogen from these sources would probably not be forthcoming before 18 months, at the earliest.

Private progress reports are being made by some USDA officials in their battle to get a portion of NPA's authority to certify nitrogen expansion. At least NPA

is giving some indication that the Agriculture Department will have more say in decisions.

Gus Geissler, Administrator of the Department's Production aad Marketing Administration, has given orders down the line to double-screen all field estimates of farmers' needs. Some of the Department's figures have been hard to defend. Geissler is taking the position in NPA negotiations of asking for what he can justify, and fighting to the limit to get it.

Korean fertilizer requirements, principally nitrogen, are likely to zoom as soon as some degree of stability is reached. Shipments of fertilizer to South Korea following World War II reached a peak of over half a million tons a year.

Mobilization officials are putting fertilizer at the top of South Korea's needs once again. Requirements are likely to be as large as before.

Fertilizer is credited with taking South Korea off the list of nations dependent upon U. S. food. Her imports of U. S. grain, principally rice and wheat, fell from a high of 500,000 tons a year to zero. The food position of South Korea improved so markedly that she exported 90,000 tons of rice to Japan shortly before the outbreak of hostilities.

State laws, putting a floor on plant-food content, are not expected to cause a problem in most states, since reductions are not likely to be that severe, in the opinion of most Washington observers. They believe, however, that major overall reductions in plant food content would have to be approved by the Legislatures in most of the States.

USDA still says no fertilizer allocations. Emphasis will be on conservation, with agronomists given the job of jiggering NPK ratios in keeping with supplies and the reaction of various crops to plant food elements.

A regional and state approach to the problem is the aim of Washington officials. They are attending regional fertilizer meetings during which state officials and manufacturers are trying to find the "right combinations".

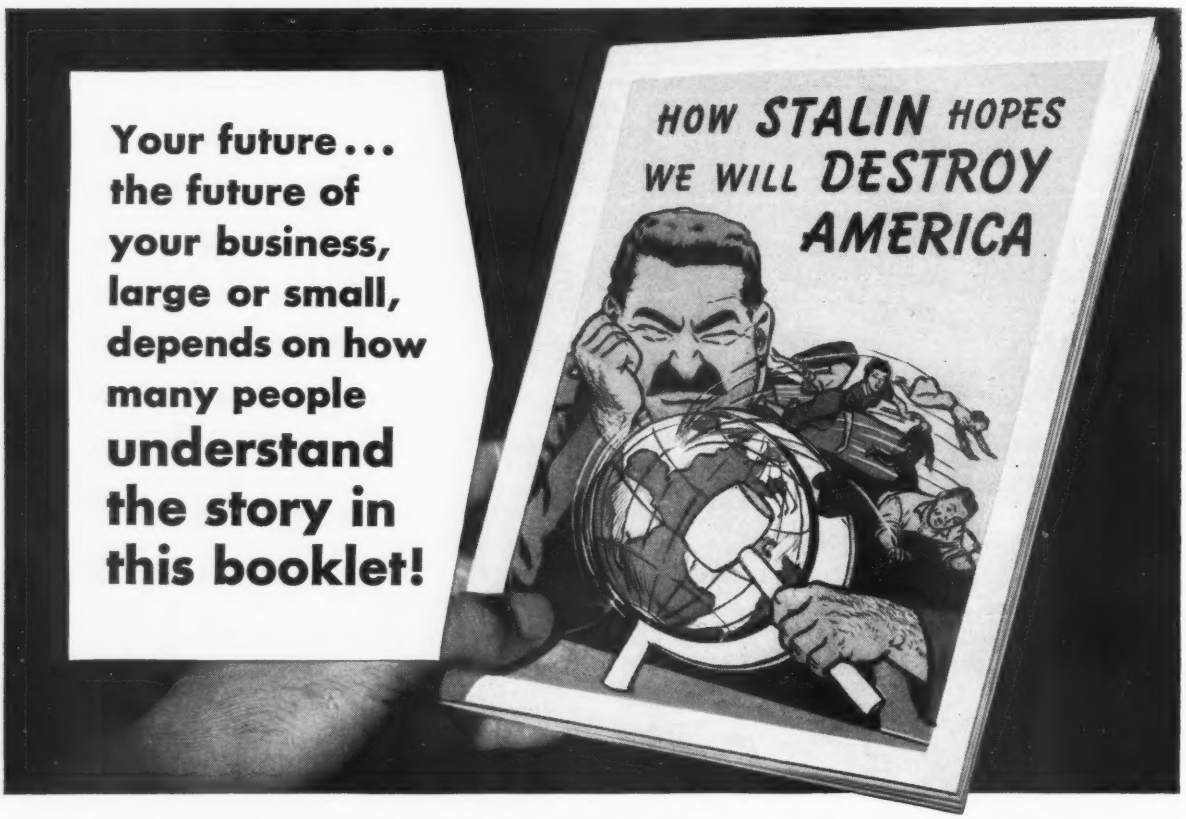
Legislative battle over state pesticide laws shows a marked trend toward increased registration fees in many states. Among measures not passed are: proposal for the manufacture of pesticides in Oklahoma prisons, and a Texas bill requiring that all users of pesticides register and pay a fee. While not the biggest legislative year, some industry officials believe it to have been one of the most difficult. They see more trouble ahead.

The threat of increased "DO" orders is hanging over DDT producers like the "sword of Damocles". Pressure is coming chiefly from outside the U. S. Requests for DDT by other nations are steadily mounting, causing NPA to resurvey producers for additional supplies. Coupled with this are military requirements, plus public health needs.

DDT production is informally estimated at 105-million pounds, technical grade, up about 10 per cent over a year ago. Extent of demand is indicated by the near 100 per cent increase in price since Korea. Some increased production is hoped for next year.

Domestic demand for all pesticides is reported spotty, with outbreaks of corn borer, boll weevil, and grasshoppers under par at the onset of the season. Some emergency shipments of pesticides are being called for to control unexpected outbreaks of the army worm in Texas. Many industry visitors to Washington say business could be a little better.

There IS something YOU can do ABOUT INFLATION!



Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its ***causes*** *and* ***cures.*** *Then we will have gone a long way toward eliminating this pending catastrophe.*

ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it"...."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it"..."In picture form it impresses you more. Most people don't read about it"..."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

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Special Report On

Farm Chemicals Packaging

A. M. Brodine
Managing Editor

MOST OF THE 18,232,874 tons of commercial fertilizer sold in the United States during 1950 was shipped in multi-wall paper bags in sizes ranging up to 100-pound capacity. During 1949, the Bureau of Entomology and Plant Quarantine reports, the estimated expenditure for pesticides of all types was $200,000,000. Because of the toxic nature of these substances, all of these products reached the ultimate user in some type of package—either paper, metal, paperboard, laminated paper, plastic, or combinations of such materials.

All of these packages of farm chemicals—totaling many millions in number each year—must be handled, filled, weighed, sealed, labeled, stored, and shipped. This poses a series of continuing problems with which the farm chemicals producer must deal. Not only must he meet growing competition for all the types of materials and machinery he uses, but he must do so under the added burden of an increasing number of complex government regulations.

Job of the Package

One thing the farm chemicals maker has to consider is the sales appeal of the package that carries his product. To draw customers the package must make itself seen and identify its product immediately. In addition, the package has to be so designed that the product will reach the customer in the best possible condition without excessive losses due to breakage or moisture. Besides all that, the package must meet all legal requirements as to precautionary statements and contents.

New packaging materials have been developed constantly at an increasing rate since World War II. Often a new material can hardly be appraised before another appears to take its place. Obviously, there isn't room here to discuss even a small fraction of the available new materials, but a few can be mentioned as examples of the progress made in recent years and months.

Polyethylene is the number one development in plastics for packaging due to its inertness and resistance to vapor transmission. Many laminations of polyethylene to paper and boxboard are now available. Films about three-quarters of a mil thick are extruded and pressed into the paper or boxboard in a continuous process. This technique reduces the amount of polyethylene required, and this is a boon because of the tight supply.

Another new type of product, manufactured by the H. P. Smith Paper Company, is called "Sara Pak 1." It is a kraft paper coated with saran and is said to have some interesting characteristics. Tests indicate it has most of the desirable qualities of a saran film without requiring special packaging and sealing equipment. Properties built into the film depend upon the weight of the paper used and the thickness of the film applied to the paper. The product can be handled on any machine which makes face to face heat seals and the seals are said to be extremely strong.

Sealing with heat is, itself, a relatively new concept. It is an efficient method of sealing and labeling packages made of the new thermo-plastic materials.

An all-paper combination, sift-proof bag is being produced in sizes from 1 to 25 pounds by the Benj. C. Betner company. The combination can be put together in almost a dozen different ways, depending upon the characteristics desired in the finished package. The combination is reported to provide good protection against moisture and the strength of the seal is said to be excellent. The method by which the bag is folded and sealed, on a machine designed especially for the purpose, insures against sifting of even the finest-ground powder—a fact that makes the bag of interest to packers of pesticidal dusts. Betner also produces a bag of the same general type involving the use of a polyethylene liner.

Multi-wall Bag Design

Multi-wall kraft bags have been improved in design at almost the same pace as new materials of other types have been offered. Scarcities of wood-pulp, however, make the steady supply of paper bags almost as uncertain as containers made from materials restricted in use by government regulation. The scarcity exists in spite of the fact that total production of unbleached kraft papers was about 12 per cent higher in April of this year than at the same time in 1950. During that period the production of bag and sack papers increased approximately 30

per cent. Sulphite paper manufacturers say that is cause of the 20 per cent reduction in the amount of unbleached kraft wrapping paper available during the first quarter of 1951.

Already there are signs that the kraft paper shortage may be eased in the near future. At Pine Bluff, Arkansas, the Hammond Bag and Paper Company has started the construction of a $300,000 multi-wall paper bag plant. Expected to be in operation by September 1, the new fireproof plant will replace the company's present facilities at Pine Bluff which are to be taken over by the Army on that date.

A new, $600,000 container plant is now under construction in Dallas, Texas, by the National Container Corporation. An integrated operation that will handle all the major steps involved in the production of corrugated paper board, the plant will turn out boxes for Southwestern manufacturers who in 1950 consumed a large portion of the company's output.

Textile Packages

Use of cotton bags for fertilizers is being promoted by the National Cotton Council which recently reported that cotton bag converting companies are offering from 23½ cents to 30 cents each for empty 100-pound cotton bags. The Cotton Council sees this as an inducement for manufacturers to specify cotton by offering them recovery of their container costs.

During World War II, war conditions increased the demand for waterproof packages made from kraft asphalting paper, and the use of boxes and containers requiring gummed kraft tape for their construction, as well as large multi-wall shipping sacks, went up considerably.

Beginning July 1, the National Production Authority's Controlled Materials Plan went into effect. The full impact of CMP on packaging equipment and materials probably will not be clear for several months. That it will require many readjustments in the packaging of farm chemicals is very likely. For that reason, many packaging experts are asking processors to look back at World War II and see what part of that experience can be used to advantage now.

World War II Lessons

One of the lessons learned from the last war is that the sales department should provide the production department with a priority listing of the various packages and products based on probable consumer demand. In many cases, because of the short supply of adequate materials, lower quality packages seem inevitable. This will require that efforts be made to reduce spoilage of materials, in some cases by revamping machine operation to allow for running down-graded stock.

With deliveries of packaging machinery likely to be slow, farm chemicals producers will want to be able to spot their bottleneck equipment and determine what is essential to keep operating. Spare parts should be stocked when they can be obtained and alternative methods selected in case of breakdown. Many break-downs can be avoided by a sound preventive maintenance program.

One thing every owner of packaging machinery can do is to see to it that he has, on hand, written operating instructions for each major piece of equipment. Also, machine operators should be carefully trained and supervised.

New equipment should be ordered when it is likely to be needed, rather than delayed in expectation of new (but as yet unproduced) machines of radical design. Many present model machines are capable of large savings in production costs.

Package Printing

Advances in packaging printing have been significant. In spite of innovations by other methods, letter press still accounts for about 75 per cent of all printing of all packaging materials. It permits strong, solid prints, sharp clear-cut effects and excellent multi-color work. New high-speed rotary letter press machines have been recently put into use for printing labels and cartons.

Printing ink makers have been continually improving and developing letterpress inks. Steam set inks used in letterpress printing continue to make progress in the packaging field. They dry due to precipitation of the binder from a glycol type solvent when exposed to steam or even to the moisture in the paper stock. It is estimated that about 80 per cent of all kraft bag printing is done with steam-set inks. Chief objection to them is their lack of gloss; but rapid drying, and non-toxicity has encouraged their increased use.

Arkell and Smiths, specialty and multi-wall bag manufacturers, recently installed a new five-color press at their Canajoharie, N. Y., plant. During the past nine months the company reports, increased printing capacity has been added to each of its production plants.

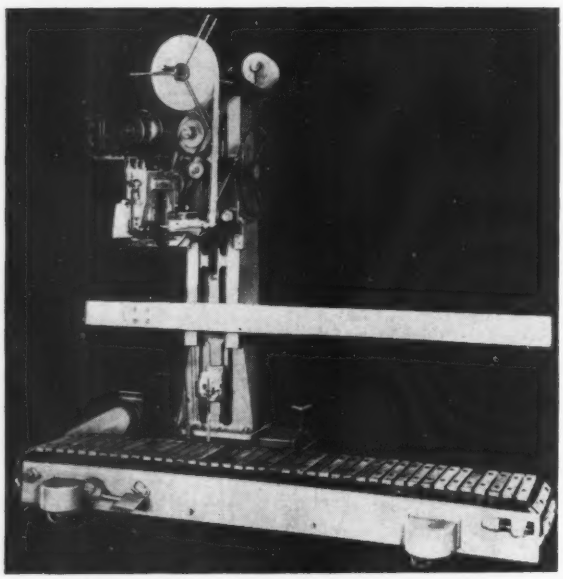
Operating Rules

There are certain basic problems that face all producers attempting to achieve maximum use from their packaging equipment. Packaging engineers have devised a number of general rules which will help keep the packaging line running smoothly:

1. Keep your equipment modernized to meet modern requirements.
2. Standardize the various features of your containers to permit machine flexibility.
3. Adapt machines to suit your package and revise your package to meet machine requirements.
4. Keep machines in production by making adjustments without stopping and eliminate operating problems with improved feeding devices and safety controls.
5. Adapt machines to do more work or operate at higher production speeds.
6. Establish a complete maintenance program consisting of aggressive supervision and mechanics who cooperate with machine operators to achieve your production goals. This team must be backed up by an adequate spare parts program, shop facilities and instruction.
7. Exchange information with your fellow manufacturers to mutually benefit from each other's experience. ◆

Farm Chemicals Packag

Heavy-Duty Bag Packer



Bagpaker handles 15 packages a minute

Designed to close the tops of either multiwall paper or textile bags, the Model ET Bagpaker produced by the International Paper Company is capable of handling up to 15 packages per minute. The heavy duty machine has been used in the packaging of fertilizers, insecticides, and other farm chemicals.

A creped kraft tape is applied to the bag-end prior to the sewing operation and the machine then stitches through the tape and bag-top simultaneously. The sewing unit is a Hoepner No. 150 Heavy Duty type.

The Model ET can be adjusted for a bag range of from 25 to 100 pounds capacity. Two motors are utilized, one unit ¾-hp. driving the conveyor and a ½-hp. unit operating the sewing head. For closing textile bags and for some made of paper, the tape applying mechanism is easily removed and a plain reinforced stitch is effected without the use of a tape.

A two-position foot pedal controls both the sewing head and the conveyor. The first depression of the pedal starts the conveyor and further depression operates the sewing head. A locking device allows continuous operation of the conveyor. ◆

Further Information About the Machinery Described In This Section Can Be Obtained [illegible]iting T

Automatic Net Weigher

Four types of Edtbauer-Duplex Automatic Net Weighers are offered by the B. F. Gump Company. Each comes in a range of four sizes with a discharge range of from 4-oz. to 2-lbs. All are designed for discharging pre-determined net weights of dry material.

The gravity feed models, Type S.C. are used with free flowing materials that can be weighed accurately without power through use of a gravity feed. The weight of falling material operates the weighing mechanism which divides a continuous stream into net weight units.

Power feed models, Type S.C.A. and Series B include three types and are used when the material will not readily flow in an even stream to the weigh hopper. The S.C.A. model has a pin-type power feed and is designed for use with materials of small particle size.

Series B models are best suited for materials with a larger particle size and feature a disc-type power feed. Power feed models are also available with either pin- or disc-type feed and electrical discharge controls. All types of power feed are available for each of the weigher sizes.

Weighers are available in four sizes. No. 1 handles units of material weighing from 4-oz. to 2-lbs.; No. 2: 4-oz to 5-lbs.; No. 3: 3- to 25-lbs., and No. 4: 5- to 50-lbs.

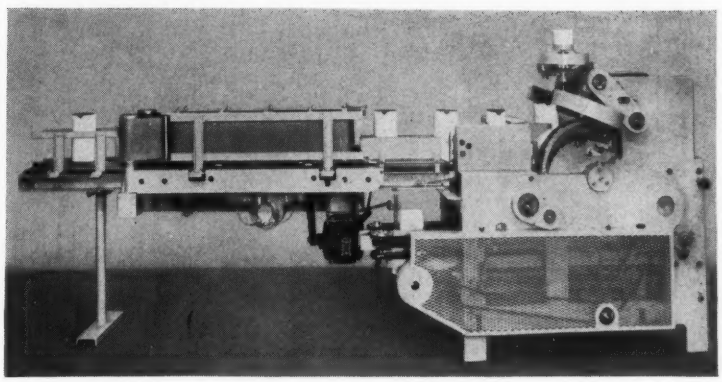
Standard net weighers discharge automatically as soon as the desired weight is in the weigh hopper. Manual or electric switch discharge control is available for most models at additional cost. For operation with automatic container-handling equipment and continuous mixing systems, the company recommends use of the Series C power fed weighers. ◆

Duplex Net Weigher

kag Machinery Review

Closing Machine for Small Packages

The Deltaseal closure is featured in the new Series No. 3187 bag closing machine, marketed by Bemis Bro. Bag Company. Filled cellophane bags in one-, two- and three-pound weights and 2- or 3-lb kraft paper bags are handled by the Deltaseal Closing Machine. Easy opening of the filled packages is obtained through the pouring spout on both cellophane and paper bags.



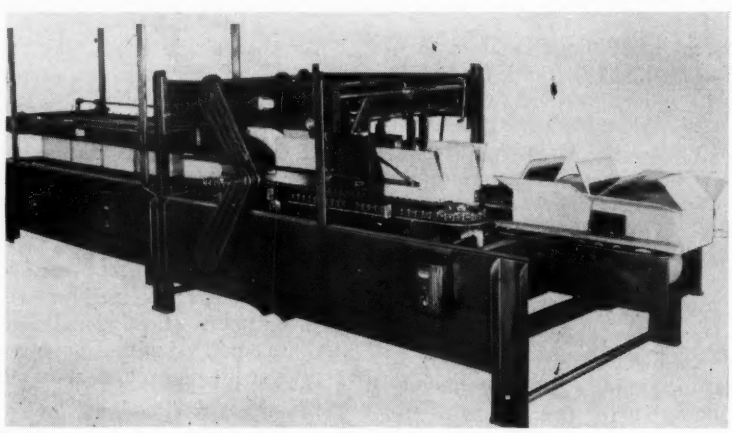
Deltaseal Machine closes cellophane or kraft bags

Fully automatic, it consists of a shaker, the closing unit, and a conveyor that transports the bags from the closing unit to the casing or baling station. The conveyor is regulated to allow for drying time.

Adhesives assuring tight closure of either plain or moisture-proof cellophane bags can be used. If heat sealing is required, a heated belt system can be obtained on which the packages travel under pressure.

The machine can be adjusted in from 30 to 60 minutes to handle different size bags. Units now in operation are closing from 60 to 70 bags per minute. ◆

Case Sealer Comes In Eight Models



Case Sealers by A-B-C are versatile

A-B-C- Packaging Machine Corporation is producing eight models of the ABC Short Case Sealer. All are equipped with an automatic glue skip, ball-bearing suspended shafts and rollers, motors and electrical controls, and are adjustable to a wide range of case sizes.

Model SA is an automatic top and bottom sealer with heaters to dry the adhesive. It comes equipped with an automatic feed and rear flap tucker. A similar machine is the ST, supplied with heaters for top flaps only.

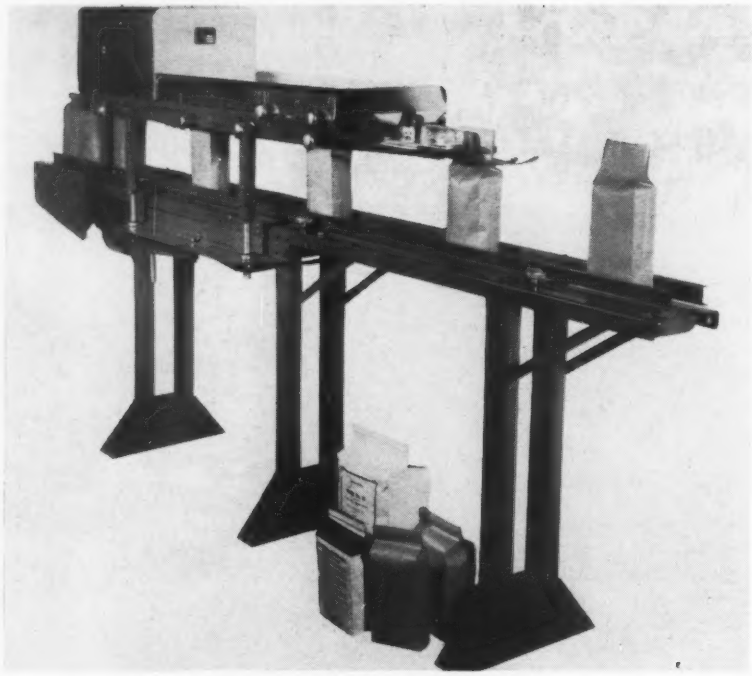
For semi-automatic top and bottom case sealing the Model SSA is recommended. The operator packs the case on a table in front of the sealer and pushes the case into the unit. Model SST is also semi-automatic in operation, sealing the top flap only.

Four models: XSA, XST, XSSA, and XSST do not come equipped with heaters. A longer compression period is necessary when using any of the machines in this group.

The company claims that when units are purchased equipped with heaters, the compression period required for any given speed is less than half of the time normally recommended. ◆

Packaging Review . . .

Sift-Proof Bag-Sealer



Semi-automatic bag closer seals with heat

Benjamin C. Betner Company is supplying a special machine for use in closing their Duo-Tite bag. The bag closer is semi-automatic in operation, double folding and heatsealing the inside of the bag, then gluing the second fold to the first to produce a sift-proof and strong package. Double-folding, heatsealing, and gluing are automatic operations and only the tucking or pre-forming of bag gussets is semi-automatic.

The Duo-Tite bag is a gusseted tube with side seam. After the tube is formed, Thermoseal is applied to one or both ends in a strip at least, 1½-in. wide. When the bottom is closed, sifting of fine powders is impossible and the construction does not allow the packaged material to force open the closure.

White or kraft bags in either duplex or triplex styles are available with linings of kraft, single wall or laminated glassine, or polyethylene treated kraft. The latter material is recommended for use where both moisture vapor proofness and strength is required.

Bags are available in sizes up to and including an eight-inch face, 5½-in. gusset, and 22½-in. finished length. ◆

Vacuflow Filler Has Rotating Head

Vacuflow Filling Machines, manufactured by Pneumatic Scale Corporation include several rotary and single- or double-head units. All operate on the Vacuflow principle in which air is drawn out of the container resulting in free particles falling into an air-free atmosphere, allowing accurate, dust-free handling.

Rotary models are used for filling cans up to 7½-in. diameter and 9½-in. high. Filling speeds up to 300 per minute are possible, depending on the container size and number of filling heads.

The Model D single head filler is manually fed and designed for filling small and medium size containers. It is recommended for producers of a variety of items on a low tonnage basis.

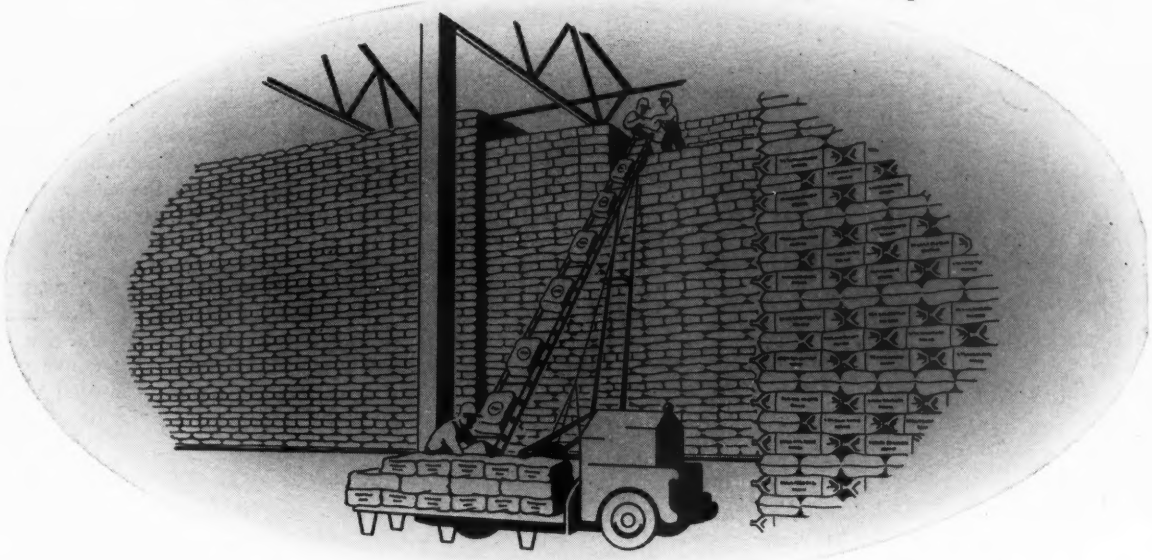
Another single head filler, the Model E fills containers ranging from 25 to 100 pounds. It is adapted for use with metal and fibre drums with a maximum container diameter of 24 inches. Speed of operation is dependent on the operator's efficiency and the container size.

All models can be used on either free- or nonfree-flowing materials, and are equipped with air-operated container-lift plates and automatic safety cut-offs.

Bulletin No. 111 describes the full line of Pneumatic Scale equipment. Specifications on their feeder and bottom sealer, net weighers, top sealers and closers, fillers and sealers, wrappers, and double package makers are included. ◆

Much more goes into HAMMOND *Multi-Wall* BAGS

than the products they dependably carry



Yes, a great deal more goes into Hammond Multi-Wall Bags than the hundreds of products that are now safely and dependably shipped in them. Here are a few reasons for Hammond's steady growth and for the steadily increasing demand for these Better Bags:

1. Only papers and materials of highest quality are used in the production of Hammond Multi-Walls.

2. Hammond's two large plants are devoted almost exclusively to Multi-Wall Bag production, placing at your service a highly specialized organization for your shipping bag needs.

3. Pride of workmanship and a thorough knowledge of your shipping problems assure you of utmost care of your Multi-Walls through every phase of production.

4. Modern machines and materials handling equipment keep costs to a minimum—to assure you of Multi-Walls of maximum strength at competitive prices.

Write for your copy of "To Serve You Better with Hammond Multi-Wall Bags"

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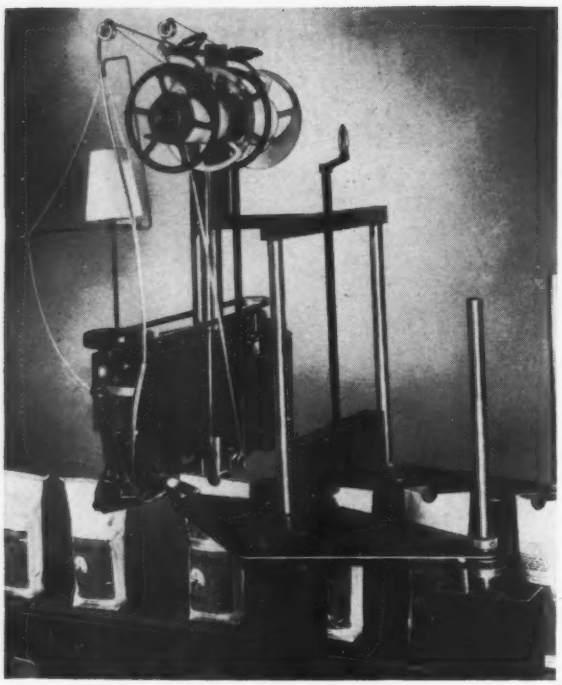
Packaging Review . . .

New Model Bag Closer



Union multiwall bag closer

A second model has been added to the B & D line of automatic multiwall bag closers. Developed by Edward Dilatush & Company in conjunction with the Union Bag and Paper Corporation, the Model 1210-M handles multiwall bags up to 46 inches in length.

In the B & D Automatic Bag Closer, moving conveyors lead the filled bags between two V-belts. These collapse the tops of the bags and take them through the sewing head for an automatically sewn closure. When the bag has been closed, an automatic switch stops the sewing head and the trailing chain of sewing thread is cut. Speed of the conveyor is synchronized with the sewing-head speed at 34 feet per minute.

The multiwall model is of all steel welded construction and is fitted with roller bearings. Standard equipment includes a special sewing head and a ten-foot conveyor. Fifteen- and twenty-foot conveyors are also available. Production rate is limited only by the efficiency of the operator and the bag filling speed.

The original B & D bag closer, Model 1210-A, is a smaller machine and sews consumer unit bags at speeds up to 2,000 per hour. ◆

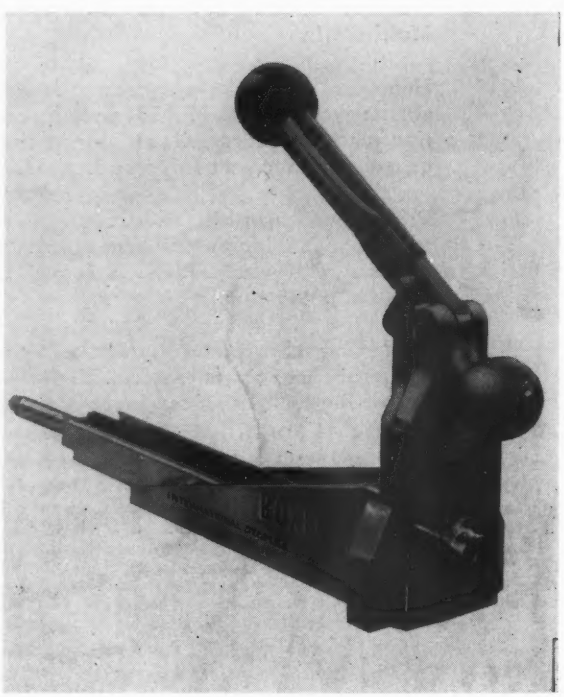
Light Weight Boxer

International Staple & Machinery Company is marketing a lightweight, portable staple machine featuring the company's retractable anvil principle. The Boxer weighs only four pounds, three ounces and is the lowest priced machine in the International Staple line.

The retractable-anvil principle allows the stapling of filled corrugated or fibre cartons from the outside. New penetration control has been added to the Boxer, which adjusts the depth of the staple clinch making sure that the carton contents will not be disturbed or damaged by the clinching operation.

The anvil is adjustable through a lever which regulates the depth to which it will penetrate. This allows quick adjustment for containers of all standard thicknesses.

Portable machines are available for manual or pneumatic operation. In addition, stationary types may be obtained to handle cartons of various sizes and shapes, of varied board thickness, and which clinch the top and bottom individually or simultaneously. Air or motor-driven models are available. ◆



SULPHUR

*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

*MOLTEN SULPHUR

The discharge lines from the wells deliver the sulphur into sumps at collecting stations which are located near the area being "steamed."

The sump is dimensioned to suit operating conditions, as well as the number of wells supplying sulphur. Cast iron has been found the most suitable material for lining the sump, and for the steam coils on the bottom and at the sides which keep the sulphur in a liquid state. When the sump is reasonably full, pumps force the liquid sulphur through insulated pipe lines to the vats. The pumps are especially designed for this service, the moving parts being either submerged in liquid sulphur or steam-jacketed.

Loading operations at our Newgulf, Texas' mine

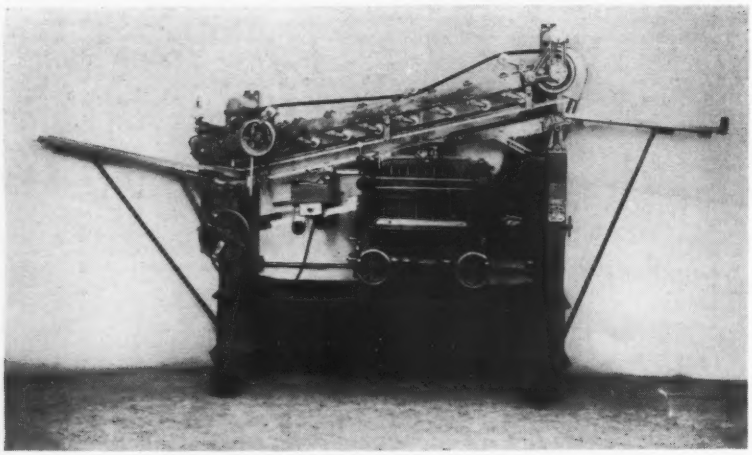
TEXAS GULF SULPHUR CO. INC.

75 East 45th St. New York 17, N. Y.

Mines: Newgulf and Moss Bluff, Texas

Packaging Review . . .

Continuous Labeling Machine



Chisholm-Ryder labeler has continuous feed

The Model E labeling machine produced by the Chisholm-Ryder Company of Pennsylvania is especially adapted for the handling of round containers. It has a continuous feeding arrangement for labels so that containers need not be stopped while the machine is being filled with labels. It elevates while labeling, eliminating any intermediate elevator in the packaging line.

Other Chisholm-Ryder labelers include the New-Way machines, available in four types, short and long frame models and in adjustable or fixed styles. They will label all sizes of cylindrical tin, glass or fiber containers from a 112 x 112 (1¾-in. x 1¾-in.) size to 611 x 708 (6 11/16-in. by 7½-in.) without the use of change parts.

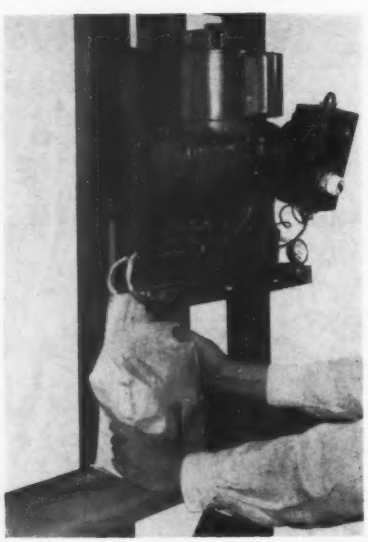
Model MH is a short frame unit, the adjustable style handling all sizes of containers from 112 to 406 diameter to 112 to 708 body height. The nonadjustable type handles any one size of container in a range of from 112 to 406 diameter to 112 to 900 body height.

The adjustable long frame C-10 labels all size containers from 112 to 611 diameter and from 112 to 708 body height. A nonadjustable style takes containers from 406 to 611 diameter by 200 to 900 body height.

V-belt carriers on the New Way labelers take the containers through the machine by running on the bead of cans or edge of jars, bottles, and similar containers. This prevents an accumulation of pick-up gum on the belt which would deface the labels.

Paste is applied by means of a rubber belt which reduces the cutting and tearing of labels. Spring or bead-chain belts can be substituted. Spot label attachments are available permitting the use of labels which do not completely encircle the container or extend fully from top to bottom. Special models can be obtained for handling cans with ears used as bales or jugs with handles. ◆

Heat Sealer Is Versatile



Pacer Model 15 SPF heat seal machine is an adaptation of the standard Pacer units produced by the Globe Products Division of Heat Seal Corporation. It is a specially adapted upright mounted machine developed for use in heat sealing large bags containing fertilizer, insecticides, fungicides and other farm chemicals.

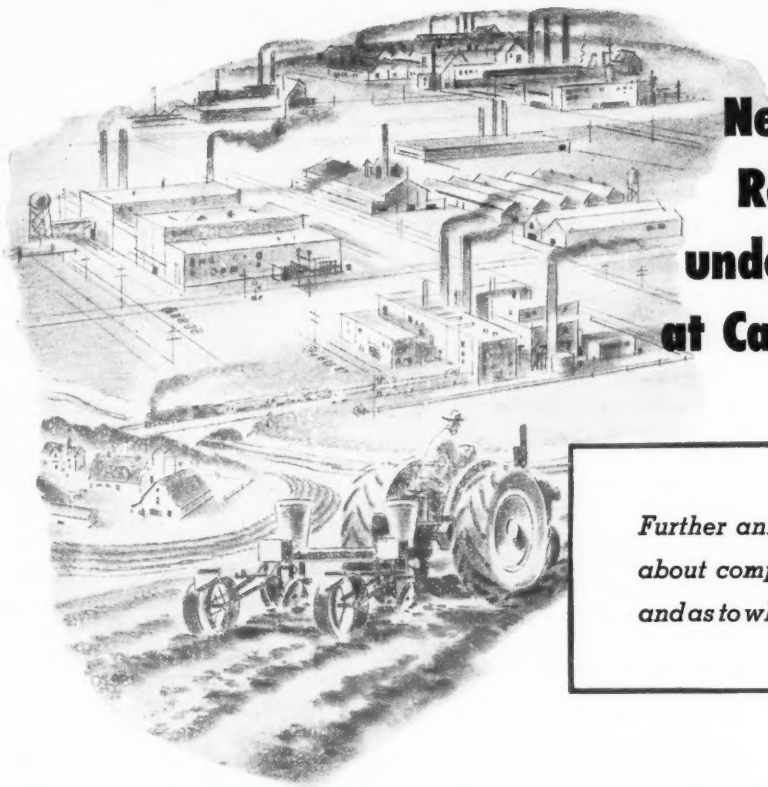
The operator feeds filled bags into the machine where the tops are automatically heat sealed, producing a moisture-proof and air-tight package. Jaws of the machine allow sealing of packages up to fifteen inches in length.

Bags can be brought into the unit, through it, and on to the next operation on a flat conveyor belt or a gravity roller system. Feeding of each bag pushes the previously sealed package through the machine. Operation from a table or board is possible if a conveying system is not included in the packaging line. Heat sealing of up to 2400 consumer-size units per hour is possible with the Model 15 SPF.

Completely automatic pressure, heat, and timing are features of the Pacer line. With the "phantom feeder" system, the jaws close when the bag is placed in position and open when the closure has been made without operation of any lever or pedal. Advantages of these machines include a dust-free package. ◆

HIGH GRADE MURIATE OF POTASH WILL BE PRODUCED

by DUVAL Sulphur and Potash Co.



New Plant and Refinery now under construction at Carlsbad, N. Mex.

Further announcement will be made about completion of the Duval Plant and as to when deliveries can be made.

ASHCRAFT-WILKINSON COMPANY HAVE BEEN APPOINTED AS EXCLUSIVE DISTRIBUTORS FOR DUVAL SULPHUR AND POTASH COMPANY

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DUVAL POTASH *FOR BETTER PRODUCTS OF FARM AND FACTORY*

Fertilizer Division, ACS, to emphasize

Fertilizer Production Problems

at annual meeting in New York

On September 6 and 7, the Division of Fertilizer Chemistry of the American Chemical Society will meet at the Hotel Martinique in New York City for a two-day symposium on fertilizer technology. With Dr. Vincent Sauchelli, Director of Agricultural Research for the Davison Chemical Company, presiding, the meeting will feature papers by leading experts who will discuss many phases of the chemical and engineering advances that have been made recently in the manufacture and processing of fertilizers. Following are brief outlines abstracted from most of the papers to be presented:

Mining Rock Phosphate

Over 60 per cent of the entire known phosphate reserves in the United States are located in the Western Phosphate Field, which blankets portions of Idaho, Montana, Wyoming, and Utah.

The methods by which the deposits are mined, the nature of the material, and the expansion of the operations since 1947, largely through the efforts of the Simplot Fertilizer Company, are described by the authors. Although its present production of 600,000 tons mined this year makes the Simplot company the west's largest producer of phosphate rock, future tonnages expected to be produced by this and other companies will far exceed present tonnages.

Complete Title of Paper: Some Phases of Rock Phosphate Mining in the Western Field.

Authors: Charles W. Sweetwood, Charles Crowley and Charles A. Lee, Simplot Fertilizer Company.

Grinding Phosphate Rock

The screen analysis of phosphate rock going to acidulation affects to a major extent the qualities of the superphosphate to be prepared. In general, say the authors, the finer the grind the more desirable are the chemical qualities of the superphosphate produced. However, the authors point out, there is a major effect on physical properties and the cost of grinding which must be taken into consideration, and the paper deals with the variables involved.

Complete Title: Grinding Operations as They Affect Acidification of Florida Phosphate Pebble.

Authors: Dr. Paul V. Manning, Vice President in Charge of Research, International Minerals and Chemical Corp.; and Dr. I. M. LeBaron, Director of the firm's Research Laboratories.

New Data on Ammonia

In spite of the very considerable use of ammonium nitrate—ammonia-water and urea-ammonia-water solutions in the fertilizer industry, relatively little information regarding their physical properties has been published. Previous data published on the subject is cited and the author then presents data for solubilities, vapor pressures, and densities of the above named solutions in several ranges of concentration and temperature.

Complete Title: Physical Properties of Ammonium Nitrate-Ammonia Water and Urea-Ammonia-Water Solutions.

Authors: E. A. Worthington, R. C. Datin, and D. P. Schutz, Solvay Process Division, Allied Chemical and Dye Corporation.

Low Grade Phosphates

Small-scale studies were made of the use of low-grade phosphates in the manufacture of fertilizer-grade phosphoric acid by the sulfuric acid process. The purpose of the work was to point the direction that further and large-scale tests should take to develop uses for low-grade phosphates in the manufacture of fertilizers.

Complete Title: Phosphoric Acid from Low-Grade Phosphates by the Sulfuric Acid Process—Small-Scale Studies.

Authors: L. D. Yates and J. G. Getsinger, Tennessee Valley Authority, Wilson Dam, Alabama.

Phosphorus Situation

Phosphorus, inclusive of all its forms and derivatives other than ore, is in great demand the world over—mainly a consequence of recent expansion of application and use. The current shortage of sulfur not only restricts the sulfuric acid supply for ordinary superphosphate but also the supply of phosphoric acid for the manufacture of triple

superphosphate and ammonium phosphate. Adjustments will be necessary, declares the author, and in anticipation of some of the possible changes, he reviews current trends in the manufacture, processing, handling, and fertilizer use of phosphorus.

Complete Title: Phosphoric Acid and Elemental Phosphorus in the Fertilizer Industry.

Author: W. L. Hill, U. S. Department of Agriculture, Beltsville, Maryland.

Curing Super

Results are given for the distribution of phosphorus among the water-soluble, citrate-soluble and citrate-insoluble fractions of curing superphosphates which contained different amounts of iron and/or alumina. The authors report that the transfer of phosphorus from one fraction to another appears to be related to both the type and the quantity of R_2O_3 present.

Complete Title: Composition and Properties of Superphosphate: Effect of Aluminum and Iron Content upon the Curing of Superphosphate.

Authors: H. L. Marshall, Mathieson Chemical Corporation, Baltimore, Md., and W. L. Hill, U. S. Department of Agriculture, Beltsville, Md.

Quick-Curing Super

Studies were made on quick-curing of superphosphate prepared from a Florida rock containing 32.4 per cent P_2O_5 and sulfuric acid. Studies were made by the authors on the effect of product drying temperature on conversion of superphosphate, the effect of reactant acid temperature on conversion of dried superphosphate, the effect of sulfuric acid concentration on P_2O_5 availability of the dried superphosphate, and the effect of acidulation ratio on conversion of dried superphosphate. In none of these drying experiments was there any cake formation or sticking of the product to the drier. The product was in granular form and no excessively large agglomerates were formed.

Complete Title: Quick-Curing of Superphosphate.

Authors: G. L. Bridger and E. C. Kasputa, Iowa State College, Ames, Iowa.

Funnel-Type Mixer

The Tennessee Valley Authority has been using a funnel-type continuous mixer that has no moving parts for mixing pulverized rock phosphate with phosphoric acid to make concentrated superphosphate for the past nine years. The satisfactory performance of the low cost mixer prompted tests of mixers of this type in the manufacture of normal superphosphate. Replacing a batch mixer with a funnel-type mixer should, the authors report, reduce operating labor and possibly improve product quality.

Complete Title: A Funnel-Type Continuous Mixer for Normal Superphosphate Manufacture.

Authors: L. D. Yates and W. B. Williams, Tennessee Valley Authority, Wilson Dam, Alabama.

Superphosphate Residues

The P_2O_5 in ammoniated superphosphate that is rated unavailable to plants by A.O.A.C. procedures is contained in the citrate-insoluble residues. A method for detecting the phosphorus-bearing compounds in such residues has been devised and the technique is described by its authors. The authors report that the phosphatic compounds in the residue are not necessarily the same as those in the original ammoniated superphosphate, because of reactions in the ammonium citrate solution used to prepare the residue.

Complete Title: An X-Ray Diffraction Study of the Citrate Insoluble Residue from an Ammoniated Superphosphate.

Authors: W. J. Hect, Jr., E. A. Worthington, and E. D. Crittenden, of the Solvay Process Division, Hopewell, Va., and A. Northrup, Allied Chemical and Dye Corporation, Morristown, N. J.

Effects of Potassium

After a potassium metaphospha te from Wilson Dam had proved an effective fertilizer in pot tests, it was subjected to an 8-year lysimeter study to ascertain K-content-mobility, and attendant effects upon other out-go from two acidic soils, in parallel with equivalent incorporations of K_2SO_4, with and without limestone and dolomite. Calcium and magnesium outgo was reduced by inputs of K_2O and limestone. Sulfate outgo increased due to inputs of potassium metaphosphate. Potassium recoveries were high, varying from 76 per cent to 82.7 per cent, according to soil and use of K_2O and KPO_3.

Complete Title: The Differential Behavior of Incorporations of Potassium as Metaphosphate and Sulfate.

Authors: W. H. MacIntire, W. M. Shaw, and B. Robinson, The University of Tennessee Agricultural Experiment Station.

New Potash Muriate

The Potash Company of America has pioneered a potash muriate product consisting of fused salts. Properties of this product are somewhat unusual. Rate of moisture pick-up is slower than in the mixture of salts before fusion. Change in absorption is so slow that "set," so troublesome in other salts, is practically eliminated. Microscopic studies failed to show crystal segregation, and X-ray powder diffraction methods were used to determine crystal size. Apparently, in this material, the extremely fine dispersion of the sodium chloride particles leave the product with the surface properties of a pure potassium chloride.

Complete Title: Fused Granular Muriate of Potash and Its Properties.

Authors: E. W. Douglass and E. A. Schoeld, Potash Company of America, Carlsbad, N. M.

Nitric-H_2SO_4 Combination

The authors describe the pilot-plant development of a process in which rock phosphate is treated with a mixture of nitric and sulfuric acids and the resultant slurry is ammoniated and then dried to produce a fertilizer material that contains dicalcium phosphate, ammonium nitrate, and calcium sulfate. The products showed up favorably in tests of crop response, storage, and drillability. Estimates indicate the process to be econom-

ically attractive. For the production of equivalent amounts of available P_2O_5 this process requires considerably less sulfuric acid than is required in the manufacture of normal superphosphate.

Complete Title: Compound Fertilizers from Rock Phosphate, Nitric and Sulfuric Acids, and Ammonia.

Authors: M. M. Striplin, Jr., David McKnight, and T. P. Hignett, Tennessee Valley Authority, Wilson Dam, Ala.

Fertilizer Mixing

Various end-product physical and chemical requirements involved in the production of mixed fertilizers are reviewed by the authors. In addition to plant food content, the need for storage stability and good mechanical condition are discussed as well as the importance of thorough planning and processing necessary to meet all of these requirements. The effect of reducing the amount of conditioning and filling materials on mixing processes are taken up, and means for overcoming the problems are presented.

Complete Title: Fertilizer Mixing Problems.

Authors: Dr. Vincent Sauchelli, Fertilizer Department, Davison Chemical Corp., and R. P. Taylor, Process and Quality Control Department of the same company.

Batch Mixer Design

Development of the batch mixer, improvements in design and the reasons behind the developments in design of this type of machine are given by representatives of the Sturtevant Mill Company, who acquired the original designs in the early 1900's and have been active in developing and producing the machines since. The relationship of the machine to modern plant design is also discussed.

Complete Title: Batch Mixing in the Fertilizer Industry.

Authors: William T. Doyle, President, and Alfred T. Glynn, Engineer, Sturtevant Mill Company.

Ammonia Solutions

Expanding use of ammonia solutions as an ingredient in fertilizer manufacture has created the need for equipment especially designed to accurately proportion and combine such solutions with the superphosphate present in the blend of solid ingredients. In view of the inherent advantages observed by the authors, and the high degree of success attained in many other industries in meeting similar problems, the authors believe serious consideration should be given to its employment by the fertilizer industry. Advantages of the continuous process are cited.

Complete Title: Technical Problems in Continuous Mixing of Solids and Liquids in Fertilizer Production.

Author: Walter J. Sackett, A. J. Sackett and Sons Company.

Conditioner Efficiency

Results of 1400 laboratory caking tests on mixed fertilizers, with and without the inclusion in the mixture of some 40 different conditioning agents, indicate that the ability of inert conditioners to prevent caking is largely dependent on the initial moisture content and particle size of the mixture, and on the amount of conditioner used. Methods by which the authors reached these conclusions are described.

Complete Title: Some Factors Influencing the Efficiency of Fertilizer Conditioners.

Authors: John O. Hardesty and Rikio Kumagai, Division of Fertilizer and Agricultural Limes, USDA, Beltsville, Md.

The Multiwall Bag

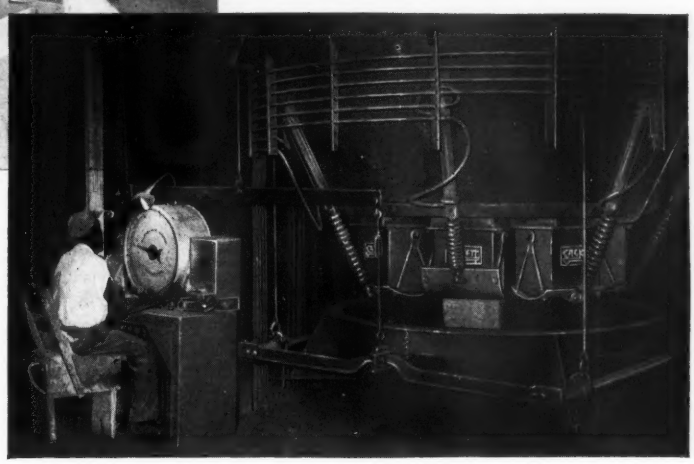
Evolution of the multiwall paper bag that made it a practical package for fertilizers is reviewed and possible future bag developments are briefly touched on. Various types of multiwall bags and forms of closures for them are discussed, and proper storage conditions and handling methods are outlined. Methods and equipment for packaging fertilizer in multiwall bags is another subject in the author's discussion.

Complete Title: The Multiwall Paper Fertilizer Bag, Past, Present and Future.

Author: W. Noyes Baler, Chief Engineer, International Paper Company. ◆

IS THIS YOUR PLANT?

Obsolete batching methods formerly used in this plant accounted for the congestion and gross waste of man power shown by this unposed photograph.



THIS SACKETT ONE MAN BATCH-WEIGH SYSTEM

Cut operation costs 65%

In the plant pictured here, production cost tumbled 65% when the Sackett System replaced obsolete method formerly used.

CHALLENGE US TO DO AS WELL FOR YOU

You can be sure the estimated cost savings included with Sackett's Survey of your production operations will be met . . . or exceeded.

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Delaney Hearings Debate:

Do We Need Pest-Control Chemicals?

Part II

Dr. Fred C. Bishopp, Assistant Chief of USDA's Bureau of Entomology and Plant Quarantine, summarizes the overwhelming evidence in favor of the intelligent use of pesticides

Statement by Dr. F. C. Bishopp *June 12, 1951*

THE FACT that the people of this country are the best fed in the world, are so well clothed, have such a high degree of freedom from diseases, and are surrounded with so many of the comforts of life is due in considerable measure to the development and general application of methods for controlling insects, and plant and animal disease.

Of approximately 80,000 different kinds of insects in this country, about 6000 cause damage to crops, fabrics, stored products, forests, wildlife, livestock, and man. Losses by these various insect pests are estimated to be four billion dollars annually. Fortunately, other billions of dollars have been saved as a result of the timely and effective application of control measures, particularly with the newer insecticides.

It should be emphasized that insect and disease damage begun in the field does not stop with harvest. Such losses after harvest are especially serious because they include all the costs of production, harvesting, packing, shipping, and storing.

Hazards Recognized

It is fully recognized that the use of toxic materials for pest control may be hazardous and that steps should be taken to safeguard workers in manufacturing plants, users of the pesticides, and consumers of the food products. It appears, however, that emphasis has been placed on hazards of use rather than on the great benefits derived from their proper use.

Producers of food are in a serious dilemma. Because of Federal legislation enforced by the Food and Drug Administration, producers must avoid insect contamination on the one hand and pesticide residue on the other. Chemicals that will result in the contamination of foods with harmful residues must not be employed. However, unreasonable restrictions placed upon the use of pesticides required for food production would make it unnecessarily difficult to control pests and, also, will tend to stifle research and the development of improved materials needed for fighting them.

In 1949, the estimated expenditure for pesticides was $200,000,000. This huge expenditure shows, indirectly, the need for control materials, for it is certain that growers would not pay this fee, plus additional costs for application, unless they receive a fair return for their investment in pest control. The consumer benefits by receiving an abundance of many healthful foods tha would otherwise be impossible to procure.

Long-Time Killers Controlled

The discovery and use of highly effective new insecticides has not only made it possible to control many insect carriers of diseases but to consider, also, the possibility of eradicating from large areas diseases like malaria, yellow fever, dengue, plague, epidemic typhus, and murine typhus.

In the United States and in other parts of the world the malaria rate is continually being reduced markedly by widespread control programs, including aerial and ground applications of DDT and the spraying of the interiors of homes in malarious areas with DDT or with one of the newer persistent insecticides.

In this connection, the Expert Committee on Insecticides of the World Health Organization said, "The Committee wishes to state that overwhelming evidence showed the harmlessness to man and mammals of DDT as commonly applied for residual spraying and accordingly deplored rumors to the contrary."

Perhaps one of the greatest public health accomplishments recorded was the outstanding control achieved with insecticides of major epidemics of louseborne typhus in heavily infested populations during World War II. Authorities agree that the use of DDT stopped the typhus epidemic in Naples, Italy, and subsequent outbreaks elsewhere in the world—saving thousands of lives.

Another example of disease control with DDT is the cooperative murine typhus program carried on by the United States Public Health Service and several southern states. About 80 per cent control of the tropical rat flea, the principal carrier of murine typhus, and a marked reduction in the numbers of typhus cases, has been obtained by the application

of 1,413 tons of 10 per cent DDT dust to premises in 10 states.

It should be pointed out that not one case of human death has been proved as due to exposure to DDT *used as an insecticide.*

The increasing use of pesticides, although assuring the consumer of an adequate supply of high quality foods, has presented spray residue problems. The hazards of residues, however, have been recognized for many years.

In the early 1920's there developed a realization that the use of lead arsenate sprays had increased to a point where American fruit was carrying quantities of residue potentially dangerous to human health from a cumulative standpoint. Action was taken by the USDA in carrying out the responsibility which it then had for the enforcement of the Food and Drug Act to keep arsenic and lead residues at a minimum. Fortunately, effective washing methods and machinery were developed promptly for removing the residue before the fruit was marketed.

DDT Recommendations

Although DDT has been tested extensively since 1942 by many agencies, including the Food and Drug Administration, there is still much to be learned regarding its use and hazards. It was assumed by various authorities that DDT applied as a dust or as a wettable powder in water would not be absorbed by cattle, but this was found not to be true.

The Oklahoma Experiment Station found that dairy cows sprayed with DDT excreted it in the milk. Shortly thereafter the Bureau of Entomology and Plant Quarantine confirmed this finding and demonstrated that dairy cows housed in barns that had been treated with DDT also excreted small amounts in the milk. As soon as these facts were established the Food and Drug Administration indicated that DDT could not be tolerated in the milk supply.

There is no evidence that trace amounts of DDT in milk would be harmful to humans. Nevertheless, in order to protect the public from insecticide-contaminated milk that might prove harmful, the less toxic and non-accumulative methoxychlor and pyrethrum insecticides were recommended as substitutes for DDT for these purposes by the USDA after consultation with the Food and Drug Administration. Dairy interests accepted this recommendation promptly despite the fact that the substitute materials were less effective and more costly.

Experiments conducted by the Bureaus of Dairy Industry, Animal Industry, and Entomology and Plant Quarantine and the state experiment stations established that residues of DDT on forage crops persist for a long time and that detectable amounts of that insecticide appear in the milk of dairy animals consuming foods containing DDT residues. This relationship is also true for several other chlorinated hydrocarbons.

These agencies and the Food and Drug Administration also demonstrated that these insecticides are stored in the fat of animals. As a consequence, none of these particular insecticides are presently recommended by the USDA for controlling insects on feeds or forage crops that are to be fed to dairy animals or to stock that is being finished for slaughter.

These potential dangers from insecticide residues are not only recognized but are clearly pointed out in precautionary statements on labels that are approved by the Insecticide Division, Production and Marketing Administration, USDA, before insecticides are released for public use.

Public Needs Factual Data

Some people have been apprehensive of the release of new and highly poisonous insecticides for public use. Actually, many of these materials are not more poisonous than nicotine, arsenicals, and sodium fluoride that have been used as insecticides for years. The newer materials have, to a considerable extent, replaced these older insecticides and are used on a much larger scale. Nevertheless, probably fewer accidental deaths from acute poisoning by the new materials occur today than were caused by the older insecticides in the past.

Although certain information on new insecticides is lacking, one of the most pressing problems is the dissemination of authentic available facts to the public. It must become more widely known that DDT and related compounds, although of relatively low acute toxicity to man, are persistent and therefore residues on crops must be reduced to a minimum.

On the other hand, while the phosphate insecticides are highly poisonous, their residues rapidly disappear. These latter compounds, although not of concern to the Food and Drug Administration from the standpoint of residues on food, are responsible for most of the serious accidental insecticide poisonings that have occurred during the last two years.

The operator must be made to realize that he is using hazardous materials and to read labels and follow directions for use in order to avoid unnecessary risks to himself and the public. These accidents have largely resulted from workers disregarding instructions to use a respirator and protective clothing because they are uncomfortable.

The eight or nine deaths reported from the use of parathion have had a more sobering effect on growers than red warning labels or legislation. Nevertheless, emphasis should be placed on educating the public to read directions and warning labels in order to avoid harm through improper usage.

Major needs today are an expanded research program on the toxicology of new pesticides and methods of their analysis to further protect the public; also greater effort to educate the public on the proper use of pesticides, inasmuch as they are absolutely essential for the proper development of our own economy and of our projected program to aid other nations.

Hearings were adjourned at this point, and on June 14, Dr. Bishopp supplemented his testimony of the 12th with the following statement:

MANY factors have intensified insect problems in this country. Important insect pests have followed the opening up of new land areas for food

and animal production. The most famous case in the history of vegetable crops is the advance of the Colorado potato beetle eastward with the opening of the West to potato culture.

To meet food needs and to support our balanced agricultural program, there have been shifts in cropping systems that have presented new insect problems or the recurrence of old ones. For example, the increased planting of grain in the southeastern states has been followed by a recurrence of chinch bug outbreaks.

Failure to rotate crops or to plant the proper sequence of crops frequently induces serious insect problems. The continuous use of land in meadows or pastures often leads to outbreaks of white grubs, a great impediment to the development of urgently needed permanent pastures.

Some of our great programs, necessary as they are, to control the disastrous effects of soil erosion and floods may encourage insect outbreaks. Water impoundments and irrigation developments often provide suitable breeding grounds for malaria-carrying and other mosquitoes, as well as horseflies and deer flies.

The dependence that growers place upon the use of insecticides in crop production can best be illustrated by giving examples of how widespread infestations have been controlled.

Savings from Pesticides

The estimated expenditure for insecticides *per se* in 1948 was about 60 million dollars and most of this was used to control pests attacking agricultural crops. Growers realize that insecticides represent a major item of cost and, therefore, do not use any more than are necessary to produce good crops.

Apple growers formerly spent $100 an acre for the control of insect pests. Before the advent of DDT the annual loss figure attributed to the codling moth, alone, was placed at $50,000,000.

Prior to the availability and use of DDT, annual apple losses due to the codling moth amounted to about 15 per cent of the crop value; now it averages about 3 to 5 per cent.

The development of inexpensive, easily applied insecticides for the control of the peach tree borer has enabled growers to realize a profit of about $3,000,000 annually.

In 1949 the value of crops destroyed by grasshoppers was estimated at $27,000,000 whereas the value of crops saved by insecticidal control was placed at $72,000,000—a saving of $55 for each control dollar spent.

In 1950 over a million acres of small grains in Oklahoma, Texas, and Kansas became heavily infested with greenbugs that occurred in outbreak numbers and threatened to destroy the crops. Fortunately, experimental work showed that a new insecticide, parathion, was effective against this pest for which there was no previously known practical control.

One of the most widespread and intense outbreaks of the velvet bean caterpillar occurred in 1946. The cooperative control program between Federal and state agencies and the growers resulted in an estimated saving of $10,000,000 to the growers of peanuts in Georgia, $5,000,000 to growers of peanut and soybean crops in Alabama, and $50,000 to producers of soybeans in South Carolina.

It is practically impossible to grow sweet corn in the South without the use of insecticides to control the corn earworm. Even in the North the losses are heavy. Now, however, growers can save from 60 to 90 per cent of their crops from corn earworm damage by use of machine applications of oil emulsion sprays containing insecticides.

Although field corn is not so severely injured, it is conservatively estimated that the loss amounts to more than $75,000,000 annually. Thus, the American farmer grows approximately 2,000,000 acres of corn each year to feed the earworm unless measures are taken to control it.

The European corn borer caused a great loss to corn growers of nearly $5,000,000 in 1941. Subsequently, the pest invaded new territories until, in 1948, there were 29 states known to be infected. The total loss of corn in 1949 was about 349,635,000 bushels as compared with nearly 100,000,000 bushels lost in 1948. Fortunately the damage during 1950 was much reduced.

Fairly good control of potato pests has been obtained for many years with arsenical, nicotine, and rotenone insecticides. It was not, however, until DDT was generally used on the potato crop that production on a per-acre basis increased materially.

Without treatment for mite control it would be impossible to produce a normal crop of tomatoes in California, and it is to be expected that a 15 to 25 per cent loss of tomatoes would occur from tomato fruitworm damage.

As a result of control activities it is estimated that sweet-potato weevil losses in the Louisiana control areas, alone, were reduced 2¾ million dollars since 1946.

The development of effective control measures eliminated the pea weevil threat to the essential canning and frozen food industries in Washington, Oregon, Utah, and Idaho.

Control of Livestock Pests

On the livestock front, the importance of controlling hornflies, lice, stable flies, and other pests was demonstrated in a recent test in Kansas where 8,000 range cattle were treated with DDT. The added gains in weight for the treated animals ranged from 16 to 131 pounds a head or, roughly, an average of 50 pounds. Kansas cattlemen figure that 5 cents worth of DDT per steer gave a gain worth around $10.

In 1950, a year of heavy boll weevil population, cotton farmers put up a good—but expensive—fight which, however, turned out to be highly profitable. The use of calcium arsenate, alone, or one of the newer organic insecticides—or in combination—enabled some farmers to make a bale per acre. In some sections, where insecticides were not employed, no cotton was harvested.

Thousands of acres of valuable forests are now saved annually from destruction by insect pests through the aerial application of insecticides. More

than 1½ million board feet of lumber was saved through the aerial application of DDT insecticides to control the Douglas-fir tussock moth on 413,000 acres of timber land in the Northwest in 1947.

Malaria Checked by DDT

The development of DDT and other new insecticides for controlling disease-carrying insects represents one of the most important advances in medical history. The control of malaria, typhus, encephalitis, dengue fever, yellow fever, filariasis, and other diseases has improved the health of man and increased his life expectancy throughout the world.

Malaria, the most important disease of man in the world, can be effectively and economically controlled by spraying residual DDT or BHC within homes. According to Dr. E. J. Pampana, Secretary, Expert Committee on Malaria, World Health Organization, ". . . territories whose total population reaches about 350 million are numbered among those where malaria is being mastered; and in a public health problem."

About 60 years ago statistics revealed 15,000 deaths per year caused by malaria in Italy. Malaria control using residual DDT was initiated in this country in 1944. During 1948, 2,850,000 premises were treated with DDT at a cost of about 50 cents per individual and for that year only 4 deaths were reported from this disease.

Unfortunately materials that will kill destructive pests may also be detrimental to lower forms of life, and its quantity may be injurious to higher animals. Entomologists recognize that insecticides are toxic and, in recommendations to the public, point out measures to safeguard the health of the operator and anyone who may come in contact with the residues.

Need for Research

Complete information on the toxicology of insecticides is not available and the desirability of much more research is clearly indicated. It cannot be emphasized too strongly, however, that complete factual information of both the insecticidal efficacy and toxicology is dependent upon extensive practical usage and evaluation.

Though rotenone is used widely for insect control and has been assumed to be safe with respect to toxic residues, it should be remembered that it has served for centuries as a fish poison and that it is now employed in the eradication of fish in pond-improvement work. Several of the newer insecticides are quite toxic to fish, however field tests show that TDE afforded excellent control of the annoying Clear Lake gnat in California without adversely affecting fish.

Honey bees must be protected if our crops are to be pollinated adequately. Fortunately, only a part of the field bees are affected by certain new materials used for insect control, particularly those visiting the field within two days after the application.

New insecticides have shown a serious effect upon the populations of parasites and predators, not only those of the pest under treatment but of associated insects that formerly were of little importance. The

use of DDT and other insecticides against the codling moth has resulted in the development of heavy infestations of the red-banded leafroller, the wooly apple aphid, and two species of red mites, mainly through destruction of their natural enemies. In general the destructiveness of beneficial forms is related to the persistence of the spray residue.

There are two major hazards that may result from the use of insecticides—(1) the possibility of sickness or other injury from the inadequate precautions taken during application; and (2) effects resulting from ingestion of edible products containing residues. The chances of acute toxicity from residues is remote, but there is a possibility of complications from eating foods daily over a considerable period of time if such food contains large amounts of spray residues.

Applications Timed

It should be recognized, however, that insecticides are applied only in a sufficient amount to protect crops, forests, livestock and people from insects and, ordinarily, this is small. The applications to crops are timed purposely so that the elements of weathering, volatization, and erosion will cause a breakdown of the residues shortly before the time of harvest.

An abundance of high quality food and fiber crops is absolutely dependent upon the use of a diversified group of insecticides. However, because the hydrocarbon insecticides are persistent and may leave residues, it is necessary to evaluate these materials in terms of their danger to human health.

During 1950 the Food and Drug Administration called a hearing to consider the establishment of tolerances for poisonous or deleterious residues remaining on or in fresh fruits and vegetables from materials used to control insect pests and plant diseases. The results of extensive experimentation and practical tests involving hundreds of formulations against pests in different sections of the country were given in detail.

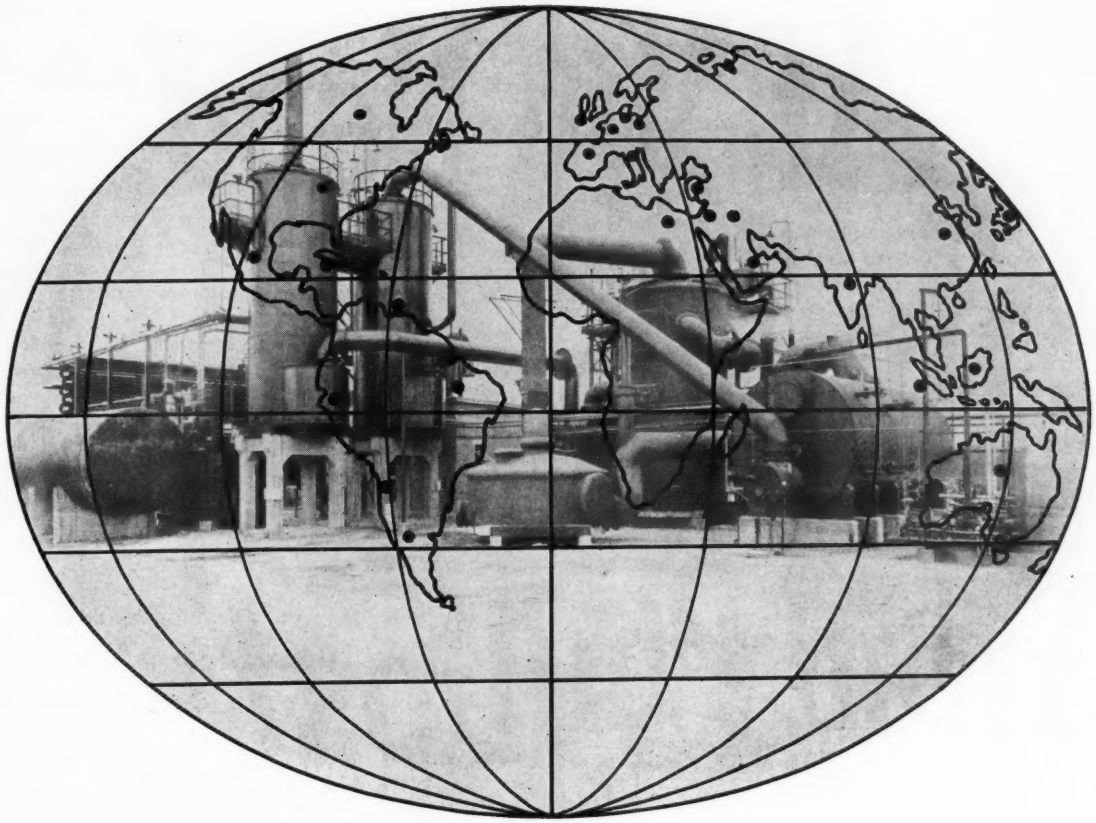
Tolerances Protect Public

The establishment of fair tolerances base on this record should insure growers that they will have available a wide selection of pesticides necessary for crop production and that, if they keep below the tolerances established, their product will not be subject to seizure and the public need not have any fear of the trace amounts of insecticide residues that may be present on less than 10 per cent of the food in our diet.

In reality the growers either select pesticide materials that are noninjurious or time applications of persistent insecticides so that only trace amounts or none is present at the time of harvest. Sometimes small amounts present on the harvested products are further diminished during storage by washing procedures or by several processing methods.

Nevertheless fair tolerances may be helpful in guaranteeing that dangerous quantities of pesticides do not reach the consumer.

(Next Month: Part III, Delaney Debate)



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FERTILIZER MATERIALS MARKET

New York

July 19, 1951

Organic materials such as vegetable meals worked slightly lower in price due to the restricted demand from the fertilizer and feed trade. Fertilizer manufacturers are not anxious to take these materials in at this time of year unless they can be bought cheaply. Soybean meal was quoted at $67.00 per ton in bulk, f.o.b., Decatur, Ill. Linseed meal was in poor demand at $52.00 to $54.00 per ton in bulk, f.o.b. production points. Cottonseed meal held fairly steady for nearby delivery. Tankage and blood last sold at $7.00 per unit of ammonia ($8.51 per unit N), f.o.b. Eastern shipping points, but these prices could probably be bettered with a firm bid in hand.

Sulphate of Ammonia

Producers are still selling on a spot basis and the market is quoted at $40.00 to $45.00 per ton in bulk, f.o.b. production points. There are reports current that at the end of this month definite contracts will be sent out on the above basis. Demand continues good from all sections.

Nitrate of Soda

No price changes were reported and material was moving in certain directions for top dressing.

Ammonium Nitrate

Several new projects will probably be started soon to increase the available supply of this material. Producers are sold out for the coming season and demand is excellent.

Nitrogenous Tankage

Producers estimate a lower production this coming year due to their inability to secure necessary raw materials. No price changes reported and the market was quoted at from $4.30 to $4.90 per unit according to shipping point.

Castor Pomace

One producer is still quoting $5.50 per unit of ammonia ($6.68 per unit N), and the other producer is quoting $37.25 per ton, f.o.b. production points. Production has been light and the demand good.

Fishmeal

With the exception of the Gulf area, the fishing along the Atlantic coast has been poor so far this season, according to reports. Menhaden fish meal is still quoted at $120.00 per ton and fish scrap at $115.00 per ton, f.o.b. production points. Demand has been fairly good from the feed trade.

Bone Meal

Demand continues steady for this material from both the feed and fertilizer buyers. Raw bone meal is quoted at $67.50 to $70.00 per ton and steamed bone meal at about $65.00 per ton, f.o.b. shipping points.

Hoof Meal

This material was slightly lower in price in sympathy with other organic materials and the market was quoted at about $7.25 per unit of ammonia ($8.82 per unit N), f.o.b. Chicago.

Superphosphates

Some small price adjustments upward were made by several companies to cover increased cost of production but were mostly of a minor nature. They are selling on a month-to-month basis and not making contracts, due to the uncertainty of the sulfur and sulfuric acid situation.

Potash

The major domestic producers were reported sold out for the new season and importers have enjoyed a good sale for their material. Demand continues excellent from all sections.

Philadelphia

July 19, 1951

There is no unusual activity in the raw materials market, and though the trade seems much concerned over the prospects of shortage of materials during the new season, there seems to be no real eagerness to buy. Still the supply remains rather tight, except possibly in the case of blood and tankage, which have reached a rather low price level.

Sulphate of Ammonia.—Production depends upon the availability of sulphuric acid and there is accordingly considerable uncertainty as to the future sulphate of ammonia situation. Coke-oven grade is presently priced at $40.00 to $45.00 per ton, in bulk at producing plants.

Nitrate of Soda.—Market is firm and while stocks seem quite sufficient to meet present requirements, there is no surplus and Chile reports demand greater than supply. Prices remain unchanged at $45.00 to $50.00 per ton in bulk, and $48.50 to $53.00 in bags, the lower figures representing domestic grade.

Cyanamid.—It is reported that production of the pulverized grade will be discontinued, and the price for the granular grade has been advanced to $65.45 per ton, in bags, at the works in Canada. Demand is far ahead of production.

Blood, Tankage, Bone.—Blood and tankage do not find ready sale at the asking price of $7.00 per unit of ammonia ($8.51 per unit N). Buyers can readily break this down 25 to 50 cents per unit with a bid. Bone meal remains steady at $60.00 to $67.50 per ton depending on grade and location, but movement is not very active.

Castor Pomace.—Production is limited and principally under contract, with market nominal at $5.50 per unit ammonia ($6.68 per unit N).

Fish Scrap.—Market for Menhaden meal is rather dull at $120.00

per ton. Catch is reported not very good at present.

Phosphate Rock.—While high grade is reported still in tight-supply position, there is sufficient lower grade to supply requirements and contract deliveries are moving regularly.

Superphosphate.—Supply position is very tight with production dependent upon the availability of sulphuric acid, and demand is now getting ahead of production.

Potash.—Market very firm and demand strong. Production is up to capacity and moving mostly against contracts.

Charleston

July 18, 1951

The movement of fertilizers in the Southeast to consumers is practically over for this season and manufacturers are primarily interested with contracting for materials for the new season. Prospects are that the three major ingredients of fertilizer will be in heavy demand with possible shortage developing particularly in superphosphate.

Organics.—Fertilizer Organics continue in firm market position with domestic nitrogenous tankage producers in a heavily sold position. Domestic nitrogenous prices range from $4.25 to $4.90 per unit of ammonia ($5.16 to $5.95 per unit N) bulk, f.o.b. production points. Rather little imported nitrogenous is offered at prices of $6.00 to $6.25 per unit of ammonia, in bags, Atlantic and Gulf ports.

Castor Pomace.—Domestic production is offered in limited supplies for shipment during August at $37.25 per ton in burlap bags and $35.25 per ton in paper bags, f.o.b., Northeastern production points. This is guaranteed minimum 6.74 per cent ammonia. Imported castor pomace ranges in price from $42.50 to $48.00 per ton in bags, Atlantic Ports.

Dried Blood.—The Chicago market is currently $6.75 to $7.00 per unit of ammonia ($8.20 to $8.51 per unit N) unground material. The New York market is approximately $7.00 per unit of ammonia ($8.51 per unit N).

Potash.—Shipments continue steady and prices firm. One of the producers at Carlsbad, New Mexico has just advanced the price of muriate of potash ½ cent, making the new price 42½ at per unit K_2O in bulk for the standard type. Granular grade is priced at 44 cents. Imported, 48/52 per cent muriate is offered at prices ranging around 67 cents to 68 cents per unit K_2O, c.i.f., Atlantic and Gulf ports. Imported sulphate of potash is quoted as 98 cents ex. vessel.

Ground Cotton Bur Ash.—Prompt and future shipment supplies are available for material testing approximately 40 per cent K_2O. Delivered prices approximate the delivered price of domestic sulphate of potash.

Phosphate Rock.—Stock of high-grade material continues at relatively low levels but supplies of low-grade material are plentiful. Demand continues strong and movement steady.

Superphosphate.—Production continues limited only by the supplies of sulphuric acid. Demand is exceptionally strong and prices are at ceiling levels. Market on 20 per cent and triple superphosphate is described as exceedingly tight.

Sulphate of Ammonia.—This solid nitrogen continues in heavy demand and production is dependent upon the available supplies of sulphuric acid. Prices continue at ceiling levels of $40.00 to $45.00 per ton, f.o.b. Coke-ovens.

Ammonium Nitrate.—Supply situation continues tight and demand heavy. Some producers are promising only 80 per cent of last season's contracts. Prices range from $69.50 per ton in bags for imported material and $61.00 to $63.00 for domestic productions.

Nitrate of Soda.—The entire imported allotment, plus a limited additional quantity, has been delivered, but no excess stocks of imported or domestic supplies are on hand. Prices continue unchanged.

Sulfur Allocation Order

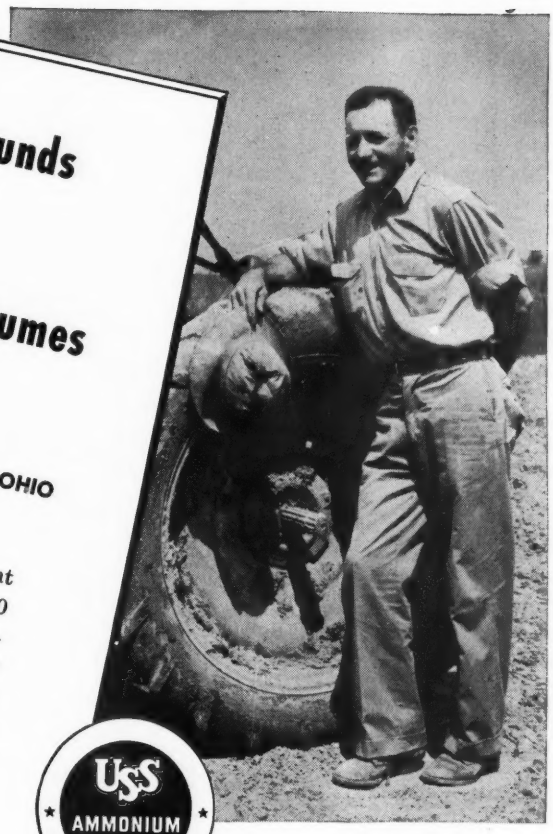
Sulfur is finally a controlled material. Beginning this month, NPA's order M-69 goes into effect. The order allows suppliers to ship sulfur only when authorized by NPA and limits users to 100 per cent of last year's consumption rate.

The order was issued because there simply isn't enough sulfur to go around. Demand this year is expected to exceed supply by one million tons although there will be a record output in the United States of 5.2-million tons, an increase of two and a half times prewar production.

Top-dressing 300 pounds of 8-16-16 meant more wheat, better legumes for Jack Carpenter

MT. STERLING, OHIO

At Mt. Sterling, Ohio, Jack Carpenter's wheat crop was top-dressed in the spring with 300 pounds per acre of 8-16-16. Mr. Carpenter reports: "The increase in yield of 11½ bushels of wheat per acre more than paid for the fertilizer, but the most important value was the better legume stand where the 300 pounds of 8-16-16 were applied."



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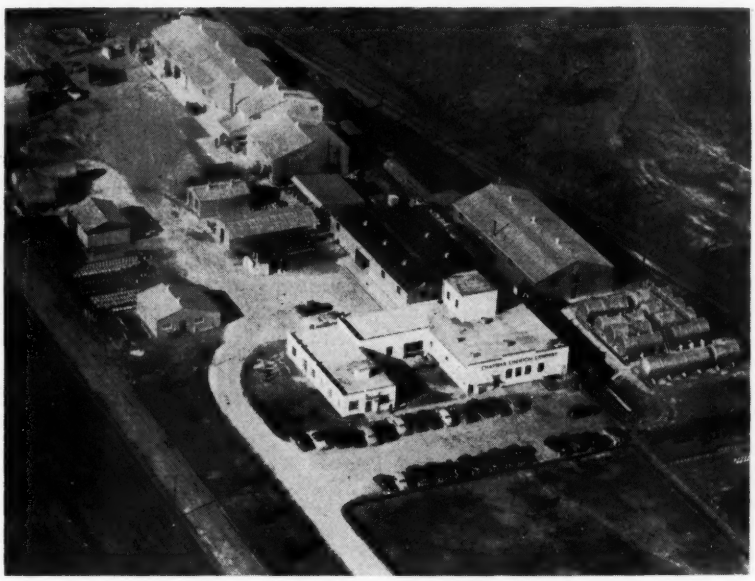
UNITED STATES STEEL

Industrial News

New Products *New Plants* *New Appointments*

Chapman Adds to Memphis Plant



Recent additions increase Chapman plant to nine acres

WORK HAS just been completed on a new addition to the Chapman Chemical Company's Memphis, Tennessee, plant as part of the company's long-range development program, according to a report by W. F. Johnson, vice president in charge of production.

The plant, which produces a variety of grass and brush killers under the Chapman label for farm and industrial use as well as wood preservatives, now covers five fully developed acres. There are now nine buildings on the site and storage space of 200,000 gallons located along an 11-car siding. Part of the facilities include a fully equipped research laboratory, recently doubled in size. The laboratory is maintained for control over manufacturing operations and for the development of new and better uses for existing insecticides and fungicides.

The Agricultural Chemicals Division of the company was organized in 1946 and work was begun on the development of organic insecticides and a great part of Chapman's growth is attributed to this phase of its operations. In addition to producing its own products, Chapman distributes the Pacific Coast Borax Company's Borascu and Polybor-Chlorate soil sterilants.

Commercial Solvents Moves New York Offices

Commercial Solvents Corporation will move its general offices to a building now under construction in New York City. Expected to be completed this Fall, the structure is located at 260 Madison Avenue. Executive offices, sales and accounting departments, and the New York district sales office will take over quarters on the ninth and tenth floors of the new building when completed.

Freeport Still Allots Sulfur

The Freeport Sulphur Company has announced that it will continue to allocate sulfur to domestic users, following the government's order establishing the second quarter quota for overseas shipments.

The present allocation program, in effect since January 1, is based on 85 per cent of purchases by consumers for the year ended September 30, 1950, and is necessitated, Langbourne M. Williams, Jr., president, declared, by the government's policy of setting aside substantial tonnages of sulfur for allied nations.

Despite the abnormal demand, Freeport and others in the industry are continuing to fill a high percentage of orders, Williams said, pointing out that current production is about two and a half times the 1935–39 average. In 1950, he said, U. S. output of brimstone, cheapest of all types of sulfur, was 5,350,000 long tons.

Rutland Plant Food Manager

International Minerals and Chemical Corporation has named John W. Rutland as general manager of its Plant Food Division.

John W. Rutland

Also, J. F. Stough has been appointed sales manager of the division.

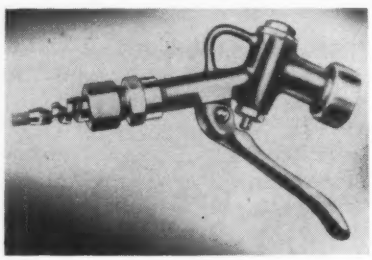
Rutland, who has been with the company for 30 years was named general sales manager of the Plant Food Division last year. Stough began his service with the company 26 years ago and has been general manager of the northern region of the division since 1948.

The company also announced recent appointments in two of its other divisions. These include Nelson C. White as general manager of the Potash Division; Sinclair B. McCoy, sales manager of the same division. Milton S. Malone is now sales manager of the Potash Division's sales office at Atlanta, Ga.

F. A. Koechlein was appointed general manager of International's Phosphate Division. With the company since 1929, Koechlein has been assistant to the vice president in charge of the Phosphate Division for the past six years.

7-1 Fog Gun Nozzle

The development of a new fog "gun" by Bete Fog Nozzle, Inc., of Greenfield, Massachusetts, makes it possible for factories



Bete Fog Nozzle

to convert ordinary garden hose into a mobile and effective inside fire fighting weapon.

With the new gun-type nozzle, a tap pressure of only 30 to 120 pounds will produce an effective fog which will instantly blanket and extinguish small fires. The manufacturer claims that such fog is effective against practically any kind of fire—oil, textile, electrical, wood, etc. The Bete nozzle has instantaneous trigger action and a positive shut-off. For further information about the new Bete fog gun, fill out **Reader Service Card.** Ask for **7-1.**

Promotions at Bemis

The Bemis Bros. Bag Co. has recently made several management and sales appointments in the firm throughout the country.

Mr. P. J. Hewitt, former Sales Manager of the Peoria multiwall plant, has been promoted to Assistant Manager. He started his career with Bemis in 1916 at St. Louis and was transferred to Peoria as Sales Manager in 1943.

Mr. W. F. Mulvaney, former Assistant Sales Manager, will succeed Mr. Hewitt as Sales Manager. Mr. Mulvaney joined the company in 1939 as a Sales Representative at Peoria. He was appointed Assistant Sales Manager in 1950.

Mr. H. O. Parrent, has been appointed Sales Manager at Los Angeles. Formerly in charge of the Bemis Sales office at Phoenix, he became a member of the company's sales force at Kansas City in 1926.

His successor as the firm's representative in Phoenix is Mr. L. P. Sempek, of Los Angeles.

Mr. S. T. Newton is the new Sales Manager at Bemis' Memphis plant.

Honorary Degree to Totman

The honorary degree of Doctor of Laws was conferred upon Mr. J. E. Totman of Baltimore, Maryland, at the commencement exercises of the University of Maine, held on June 17. The degree was awarded him in recognition of his outstanding business achievements and his loyal and constant interest in the University, of which he is a graduate.

Fertilizer Technology

Preceding the joint meeting of the American Society of Agronomy and the Soil Science Society of America at Pennsylvania State College, August 28–31, will be an all-day program on fertilizer technology. The program for the day is as follows:

9:30 A. M. Developments in world Fertilizer Production. G. J. Callister, Food and Agriculture Organization of the United Nations.

10:20 A. M. Nitric Acid in the Fertilizer Industry. E. D. Crittenden, Nitrogen Section, Solvay Process Division, Allied Chemical and Dye Corporation.

11:10 A. M. Chemistry and Tech-

nology of Ammoniated Superphosphate. J. C. Sharp, Spencer Chemical Company.

1:30 P. M. Resources, Production, and Consumption of Sulfur in the United States. G. W. Josephson, Bureau of Mines, U. S. Department of the Interior.

2:20 P. M. Particle Size—Plant Nutrient Relationships in Phosphate Fertilizers. W. L. Hill, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA.

3:10 P. M. Physical Condition in Mixed Fertilizer. Ritchie Taylor, Davison Chemical Corporation.

Dr. K. D. Jacob, Head of the Division of Fertilizer and Agricultural Lime, Bureau of Plant Industry, Soils and Agricultural Engineering, USDA, will preside over the morning session.

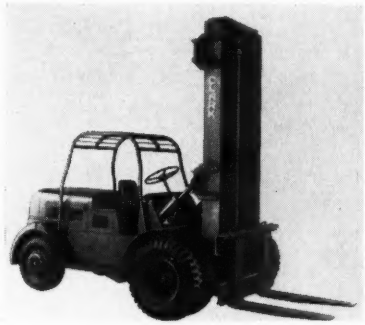
Increased CPR Allowances

According to a Supplementary Regulation issued recently by OPS, manufacturers of chemicals may add certain increased repair and maintenance material costs to base period prices established under CPR–22.

Sulfur users may use long-term sulfur contract prices instead of methods set forth in CPR–22. The alternative method is included in SR–7.

7-2 High-Load Fork Lift

The Clark Equipment Company has recently added the Yardlift-150, a pneumatic-tired truck for handling of 15,000-pound loads, to its line of Fork-lift trucks.



Heavy-duty Clark Lift

Tested in typical big-load handling operations, the Yardlift-150 is described by the manufacturer as ideal for use in lumber mill yards; in the storage yards of steel mills, steel warehouses and fabrication plants; in automotive body plants and similar installations; and for many other applications requiring fast, safe handling of extra-large, heavy loads.

Among structural features to be noted are an extra-wide axle to provide maximum stability under load. The frame is of heavy construction and all components have been designed for ample reserve strength in extreme service. For further information request **7-2** on **Reader Service Card.**

Berry Joins R. S. Aries

Howard Berry, formerly of the Mathieson Chemical Corp. has joined R. S. Aries & Associates, New York City. Previously vice-president, treasurer, and director of Mathieson, he has been named senior associate of the Aries firm.

Berry completed 28 years of service with Mathieson in an executive capacity. Earlier he was employed as comptroller of the Remington Arms Co., as general auditor of the American International Corp., and in public accounting.

He will work with Aries activities in acquisitions, mergers, cost reduction, profit estimates, and financial reports.

Fertilizer Industry Safety Program

Fertilizer Advisory Committee on Safety: Left to right, seated, J. S. Fields, Phillips Chemical; A. L. Pettit, and Miss H. V. O'Hara, Davison Chemical. Standing, W. P. Stansbury, Davison Chemical; M. H. McVickar, NFA; Paul Truitt, APFC; H. R. Krueger, Phillips Chemical, J. M. Sisson, TVA; and M. F. Wharton, Arizona Fertilizers, Inc.

PLANS WERE made for a fertilizer industry safety program at the first meeting held in Baltimore, May 16 of the Advisory Committee of a newly organized Fertilizer Section of the National Safety Congress, under the chairmanship of A. B. Pettit, Supervisor of Industrial Health and Safety of The Davison Chemical Corporation. A formal program for nation-wide action will be presented at the October 11, 1951 National Safety Congress in Chicago.

Serving in the section with Mr. Pettit, who is general chairman, are J. S. Fields, Phillips Chemical Co., Bartlesville, Okla., vice-chairman, and J. E. Smith, Spencer Chemical Co., Pittsburg, Kansas, Secretary-treasurer. The Advisory Committee consists of these officers and the following individual members: J. M. Sisson, Tennessee Valley Authority, Wilson Dam, Ala.; H. R. Krueger, Phillips Chemical Co., Bartlesville, Okla.; M. F. Wharton, Arizona Fertilizer, Inc., Phoenix, Arizona; and R. L. Hugg, International Minerals and Chemicals Corp., Chicago, Ill.

Pointing out that many other industries have for years cooperated to conduct special sessions for the solution of specific problems at the National Safety Congress, Mr. Pettit said that industries which have conducted special aggressive programs have been well rewarded by a substantial reduction in the number and seriousness of their accidents and a decided decrease in the industrial illness experienced by employees.

The fertilizer industry is being urged to send representatives to the forthcoming meeting of the Congress where measures for reducing accidents and industrial illness, such as the exchange of health and accident information, the maintaining of proper records and the analysis of accident causes, will be discussed. Mr. Pettit reports widespread interest in the program among the companies, and the National Fertilizer Association and American Plant Food Council have indicated wholehearted support.

Davison Appointments

Several new appointments to technical positions have been made recently in The Davison Chemical Corporation.

Dr. Joe D. Clary has been named superintendent of the specialty catalyst plant operated at Curtis Bay, Baltimore. Dr. Clary received bachelor's and master's degrees in chemistry from Emory University 1930–31, and his doc-

tor's degree from Ohio State University in 1938. He was formerly with the Chemical Products Corp. of Cartersville, Ga., where he was technical director.

Dr. Albert H. Cooper

Dr. Albert H. Cooper has been appointed head of the Research Engineering Department of the Research and Development Division. Dr. Cooper received his bachelor's and master's degrees from the University of Tennessee, and his doctor's degree in chemical and mechanical engineering from Michigan State College.

7-3 Electric Screen Heater

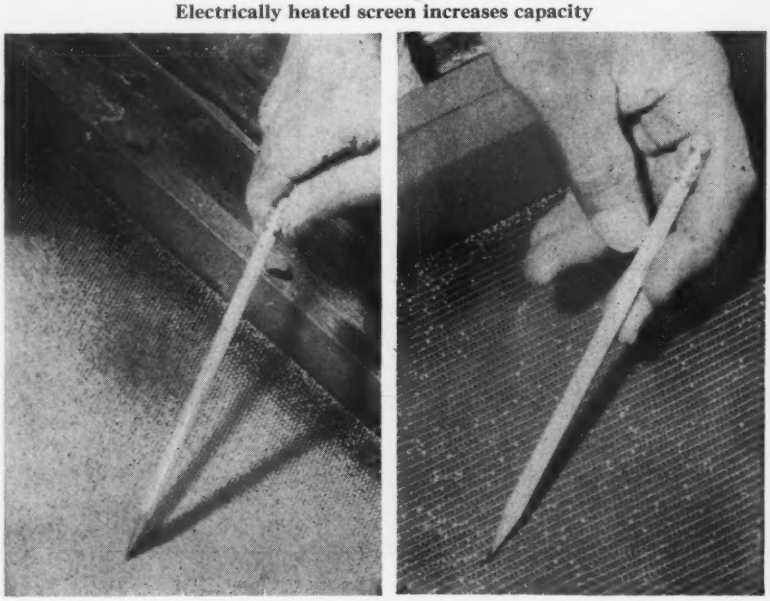
Increasing use is being made in industry of the Hannon Electric Screen Heater for speeding up screening of sand, coal, lime, ores, chemicals and other materials which contain moisture, are not inflammable or explosive, and are non-conductors. The Screen Heater was originally developed to facilitate screening of moist clay used in brick and tile manufacture.

According to the manufacturer, the heater is inexpensive to operate and will perform successfully on either new or old gravity—or vibrating-type installations. It consists of a specially-designed, high-efficiency step-down transformer which converts 220, 440 or 550-volt alternating current to low-voltage heating current. The low-voltage current is then delivered through high-amperage cables to special bus bars which extend the full length of the screen on each side.

The screen acts as a resistance to flow of the low-voltage current and is heated just enough to reduce the moisture content of the material as it passes over the mesh.

Depending on the nature and moisture content of the material being screened, screen capacity is increased as much as 50 per cent and, "beating" to keep the screen open is no longer required. This, claims the manufacturer, results in a direct labor saving as well as greatly increased screen life. For more information fill in **7-3** on **Reader Service Card.**

Electrically heated screen increases capacity



How You Can Get

Free Information

On each of the two postage-paid postcards below you can request further information on four items described on this and the Industrial News section of this issue. Fill out one quarter section for each item in which you are interested.

7-5 Packaging Guide

Bemis Bro. Bag Co. has issued a booklet entitled "Multiwall Packaging Guide."

The booklet contains historical and general information about paper shipping sacks, information on the proper storing of empty paper bags, proper handling of filled multiwall bags, filling and closing paper bags, and other information concerning the paper bag industry.

7-6 Bag Samples

International Paper Company, Bagpak Division, has released a two-page booklet containing bag end samples of the Superior Cushion Stitch Closure for multiwall paper bags.

The samples are accompanied by a description of materials involved in the product, plus instructions for proper use of the bags. Three Bagpak samples are contained in the booklet.

7-7 Conveyor Chains

Chain Belt Company has issued a bulletin which illustrates and describes the fact that conveyor chains and attachments build profits by cutting handling costs.

Chain Belt's complete line of conveyor chains and attachments, some of the standard attachment links which are used to make up chain conveyors, and some of the chains themselves are shown in the bulletin by photographs or sketches.

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

- 7-1 Fog Gun Nozzle
- 7-2 High-Load Fork Lift
- 7-3 Electric Screen Heater
- 7-4 Flex Top Conveyor
- 7-5 Packaging Guide
- 7-6 Bag Samples
- 7-7 Conveyor Chains
- 7-8 Bulk-Flo Elevators
- 7-9 Aramite 15-W
- 7-10 V-Belt Engineering
- 7-11 Dry Blender
- 7-12 Toxaphene Uses
- 7-13 Materials Handling
- 7-14 Processing Equipment
- 7-15 Hough Payloader
- 7-16 Formulation Manual
- 7-17 Speed Reducers

FILL OUT READER SERVICE CARDS

Name.....
Title.....
Company.....
Co. Address.....
.....
AMERICAN FERTILIZER & ALLIED CHEMICALS, PHILADELPHIA 7, PA.

Write in the number of the product about which you want more information

Name.....
Title.....
Company.....
Co. Address.....
.....
AMERICAN FERTILIZER & ALLIED CHEMICALS, PHILADELPHIA 7, PA.

Write in the number of the product about which you want more information

7-8 Bulk-Flo Elevators

Two booklets put out by Link-Belt Company describing Bulk-Flo elevator-conveyor-feeder, and vibrating screens, are presently available.

Both booklets are illustrated with photographs and diagrams, showing specific parts of the machinery and the machinery in operation. Charts, tables and diagrams present valuable engineering information.

7-9 Aramite 15-W

An illustrated booklet, "Aramite-15W" has just been released by the United States Rubber Company.

The new booklet contains a research background of the miticide, a partial summary of 1950 commercial applications, and instructions on how to use Aramite-15W, including proper mixing, proper application and types of equipment for most effective use.

7-10 V-Belt Engineering

A sixteen page manual of recommended "Engineering Standards for Multiple V-Belt Drives" as developed and approved by the technical committees of the Rubber Manufacturers Association, Inc., and the Multiple V-Belt Drive & Mechanical Power Transmission Assoc. has just been issued.

Data in the manual is based on the latest engineering opinion and research. Proper sheaves and belts to be used for attainment of top efficiency and economy of the complete drive in relation to the duty required, are indicated in the manual.

7-11 Dry Blender

The Patterson-Kelley Co. has a 4-page catalog number 402, describing the 4 and 8 qt. p-k Twin Shell Laboratory Dry Blenders.

By means of description and a series of unretouched photographs, an entirely new mixing principle is depicted step by step in the catalog. The catalog ends with a partial list of P-K laboratory blenders now in service. Features and special shells are also explained and illustrated.

7-12 Toxaphene Uses

The Hercules Powder Company has published a booklet summarizing those sections of various federal and state recommendations which deal with toxaphene insecticides.

The specific uses of toxaphene insecticides and their effectiveness are described individually and in tabular form in the booklet.

7-13 Materials Handling

"Material Handling News," a new manual published by the Clark Equipment Company, illustrates and describes improvements and new developments in Clark machinery.

The new equipment is described as to exact capacity, and prospective users are given necessary statistical information regarding specifications of the machinery.

7-14 Processing Equipment

The J. H. Day Company has just published bulletins No. 382 and No. 354-A which illustrate and describe their equipment used in the chemical processing field.

Discussion concerning the use and proper application of each piece of machinery together with individual illustrations are offered to the reader.

7-15 Hough Payloader

The Frank G. Hough Co. has just released a catalog, "Model HA Payloader—A fast, compact, bulk material handling unit". The bulletin pictures and describes the improved 12 cu. ft. Payloader Tractor-Shovel. The catalog shows, with photos and literature the types of jobs and industries in which the machine is currently used.

7-16 Formulation Manual

The Antara Products Division of General Dyestuff Corp. recently released a manual designed to enable the agricultural chemist to wisely select the best agent for a particular preparation.

A result of research by the company, and long term field testing, the manual offers a list of suggested formulations for use in a wide variety of insecticides and herbicides.

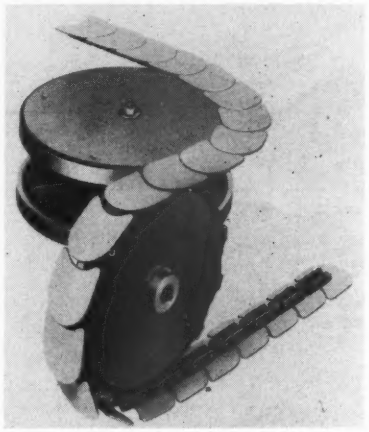
7-17 Speed Reducers

Dodge Manufacturing Corporation recently published two bulletins; A-470, which covers the Dodge Double Reduction Torque-Arm Speed Reducer series; and A-602, which gives data relating to the Single Reduction series of the Dodge Torque-Arm Reducers.

Clearly illustrated, these bulletins give comprehensive data in tabular form for quick and easy selection of the right reducer for any installation.

7-4 Flextop Conveyor

The Chain Belt Company has developed a new flat top conveyor which flexes in two planes—both horizontally and vertically—and can curve around corners with a radius of as little as 6 inches.



FlexTop Conveyor

The conveyor, now being marketed under the name, Rex Flex-Top, was designed primarily for tip-free conveying of bottles, jars, packages or small parts. For more information fill in **7-4** on **Reader Service Card.**

Spencer Ups Sales Force

In a series of promotions within the Sales Division of the Spencer Chemical Company, Kansas City, Mo., Harold R. Dinges has been named Director, Product Sales; W. W. Hutto, Sales Manager, Refrigeration Products; William

Harold R. Dinges

Schopflin, Sales Manager, Industrial Chemicals; and Claude J.

Byrd, Sales Manager, Agricultural Chemicals.

Mr. Dinges, formerly of the Mathieson Chemical Company, joined Spencer early in 1947. The three other executives entered the organization in 1946. Mr. Hutto previously operated his own dry ice distribution business. Mr. Schopflin joined directly following his discharge from the Army, after pre-war service in the sales department of Thompson-Hayward Chemical Company. Mr. Byrd has had some twenty years' experience in agricultural chemicals, with assignments as a county agent, as a Department of Agriculture official and as a sales representative with American Cyanamid.

Jaite Company Purchased

National Container Corporation has entered the paper bag business by acquiring approximately 97 per cent of the outstanding stock of The Jaite Company, one of the oldest manufacturers of multi-wall paper bags.

The Jaite company, organized in 1905, owns and operates a kraft paper mill and bag manufacturing plant in Jaite, Ohio, where its modern machinery and equipment occupy 160,000 square feet of floor space.

Mathieson Readies Doe Run

J. G. Woods, newly appointed manager of Mathieson Hydrocarbon Chemical Corporation's plant at Doe Run, and his staff have moved from Boston to the new Doe Run, Kentucky plant, to prepare the plant for initial operation.

Mr. Woods, before coming to Doe Run, headed up the Mathieson Hydrocarbon design group which cooperated with the construction firm, E. B. Badger & Sons Company, Boston, in the design and engineering of the plant.

Baker's New Address

H. J. Baker & Bro. have announced that following July 9, their new address will be 600 Fifth Avenue, New York 20, N. Y.

IMPORTANT ANGLE ON FARM PROFITS

Maybe no modern farmer would go so far as to call his job a picnic. But it would have seemed so to the old-time farmer who lacked modern means of maintaining and increasing soil fertility. Without protection against the hazards of weather and blight, he worked much harder... and he often worked in vain.

But today's farmer can harvest bigger crops and larger profits—the welcome fruits of healthy soil—by the wise use of correct fertilizers.

Many of the most effective fertilizers are compounded with potash—often with Sunshine State Potash, a product of New Mexico, and a soil nutrient which not only provides increased soil fertility, but also gives greater resistance to disease and drought.

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

Reg. U. S. Pat. Off.
HIGRADE MURIATE OF POTASH
62/63% K_2O
GRANULAR MURIATE OF POTASH
48/52% K_2O MIN.
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, *Incorporated,* **30 Rockefeller Plaza, New York 20, N. Y.**

BUYERS' GUIDE • Classified Index to Advertisers in "American Fertilizer & Allied Chemicals"

AGRICULTURAL CONSULTANTS
Bailey & Lerch, Washington, D. C.

AMMONIA—Anhydrous and Liquor
Barrett Div., Allied Chemical & Dye Corp., New York City
Commercial Solvents Corp., New York City
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

BAG MANUFACTURERS—Burlap
Bemis Bros. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Paper
Bemis Bro. Bag Co., St. Louis, Mo.
International Paper Co., Bagpak Div., New York City
Hammond Bag & Paper Co., Wellsburg, W. Va.
Jaite Company, The, Jaite, Ohio
Kraft Bag Corporation, New York City
Mente & Co., Inc., New Orleans, La.
Raymond Bag Co., Middletown, Ohio
Virginia-Carolina Chemical Corp., Richmond, Va.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES
International Paper Co., Bagpak Div., New York City

BAG PRINTING MACHINES
Schmutz Mfg., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

BONE PRODUCTS—Bone Black
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.
Hayward Company, The, New York City

BUCKETS—Elevator
Baughman Manufacturing Co., Jerseyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CARS AND CART
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Mach. Works, Aurora, Ind.

CASTOR POMACE
McIver & Son, Alex. M., Charleston, S. C.

CHEMICALS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barrett Div., Allied Chemical & Dye Corp., New York City
Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Koppers Company, Inc., Tar Products Div., Pittsburgh, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.
United States Steel Corp., New York City
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio
Quakers Oats Company, Chicago, Ill.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
Marietta Concrete Corporation, Marietta, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

HOPPERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agrictultural Chemical Co., New York City
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Kolker Chemical Works, Newark, N. J.

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

IT'S LION FOR ONE STOP Nitrogen Service FOR FERTILIZER MANUFACTURERS

Lion Anhydrous Ammonia—Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

Lion Aqua Ammonia—This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lion Nitrogen Fertilizer Solutions—Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer—The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

Lion Sulphate of Ammonia—This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

"Serving Southern States"

LION

Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking. Just write.

LION OIL COMPANY CHEMICAL DIVISION EL DORADO, ARKANSAS

Classified Index to Advertisers in American Fertilizer & Allied Chemicals

BUYERS' GUIDE

For Alphabetical List of Advertisers, see page 52

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Power Transmission
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McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

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International Minerals & Chemical Corporation, Chicago, Ill.
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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
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McIver & Son, Alex. M., Charleston, S. C.
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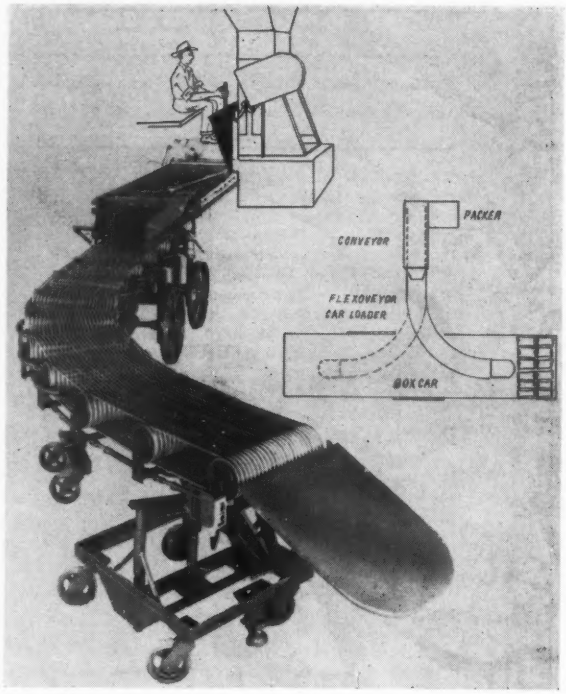

Flexible Box-Car Loader

Now available is a conveying system capable of taking bags directly from the bag-packing stations to the point of loading without the need for intermediate manual handling.

The equipment responsible for this new type of package handling service is called the "Flexoveyor." Essentially, the device is a power-driven telescoping box car loader which operates beneath the bag-filling machine conveyor and delivers the bags right up to the point of loading in the box car, thus eliminating hand trucking.

The conveying element consists of a series of endless spring belts which operate over grooved steel rollers. The car loader can be bent into any curve up to a 90 degree angle while under power and go around the box car door and into the end of the car.

As the loading progresses, the car loader telescopes under the packing machine conveyor and the flow of bags continues without interruption. All changes in position of the car loader can be made while the conveyor is running.

Thirty bags a minute is the reported capacity of the unit and its maker says the unit can be engineered to suit individual conditions. If further information is desired, fill out the **Reader Service Card** located between pages 44 and 45 of this issue. Use the number **7-23.**

THE PRICELESS INGREDIENT

The widely advertised slogan of a great manufacturer of pharmaceutical products proclaims that the priceless ingredient of a product is the reputation of the maker.

The constant aim of P. C. A. is to preserve and improve its reputation with its customers by continuing attention to their needs.

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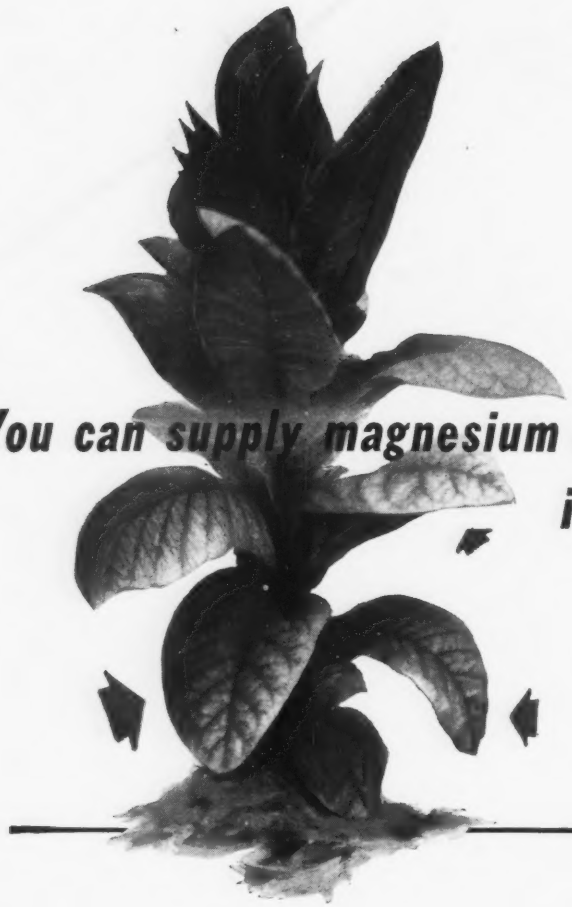

TOBACCO PLANT SHOWING MAGNESIUM DEFICIENCY

The lower leaves of the plant lose their normal color at tips, margins and between the veins. Color varies from pale green to almost white.

First in a series of six advertisements showing magnesium-deficiency symptoms in tobacco, cotton, grapefruit, corn, potatoes and oats.

You can supply magnesium in the most effective way in Mixed Fertilizers with...

Sul-Po-Mag®
Water-Soluble
Double Sulfate of Potash-Magnesia

THIS IS WHY GROWING PLANTS MUST HAVE MAGNESIUM

- It is required in the life process which gives plants their green color and keeps them growing.
- Promotes earlier maturity on soils low in magnesium.
- Enables crops to make better use of other plant foods.
- Carries phosphorus to the growing and fruiting parts.
- Necessary for the development of seed.
- Promotes the formation of proteins in growing crops.
- Stimulates growth of soil bacteria and fixation of nitrogen by legumes.
- Increases the plant's resistance to diseases.

This new booklet "Increase Crop Quality and Yields" will give you a comprehensive story of Sul-Po-Mag and its use. Write for a copy today.

All farm crops must have an adequate supply of magnesium for healthy growth. If the soil is deficient in this vital plant food element, the farmer must supply it to get healthy crops, large acre yields and a profitable return on his investment of time and money.

Many fertilizer manufacturers have found that the most practical and effective way to supply soluble magnesium for the crops in their territories is with *Sul-Po-Mag*.

Sul-Po-Mag is produced exclusively by International and is now extensively used in mixed fertilizers and for direct application. It supplies a properly balanced, natural combination of potash and magnesium, both in water-soluble form and immediately available to the growing plant.

SUL-PO-MAG (Water-Soluble Double Sulfate of Potash-Magnesia)
MURIATE OF POTASH SULFATE OF POTASH

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